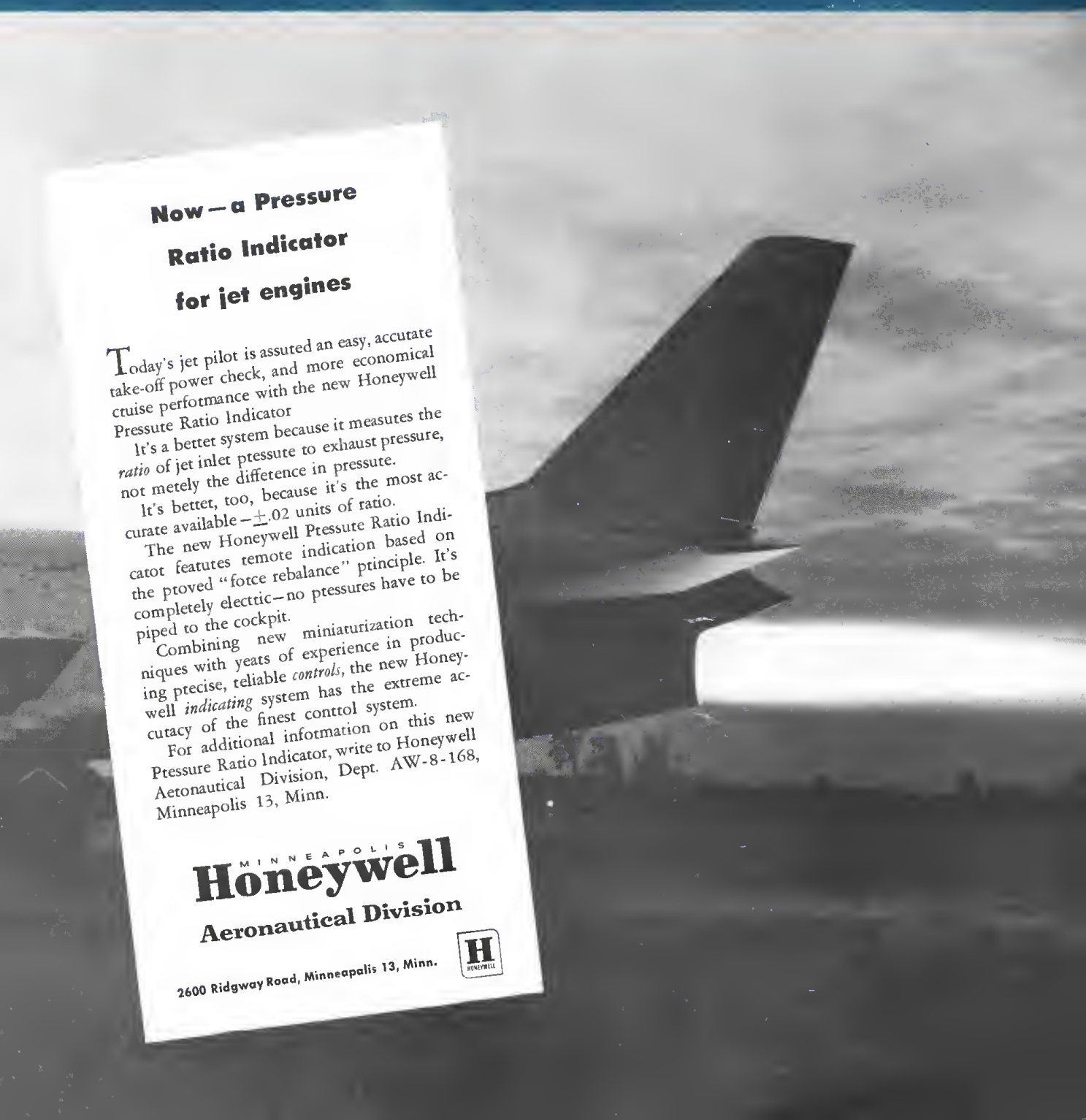
AVIATION WEEK

A McGRAW-HILL PUBLICATION

AUG. 23, 1954

50 CENTS



Now—a Pressure Ratio Indicator for jet engines

Today's jet pilot is assuted an easy, accutate take-off power check, and more economical ctuise perfotmance with the new Honeywell Pressute Ratio Indicator

It's a bettet system because it measutes the *ratio* of jet inlet ptessute to exhaust pressure, not metely the diffetence in pressute.

It's bettet, too, because it's the most accurate available—±.02 units of ratio.

The new Honeywell Ptessute Ratio Indicatot featutes temote indication based on the ptoved "fotce rebalance" ptinciple. It's completely electric—no ptessures have to be piped to the cockpit.

Combining new miniaturization techniques with yeats of experience in producing ptecise, teliable *controls*, the new Honeywell *indicating* system has the extreme accutacy of the finest conttol system.

For additional infotmation on this new Ptessure Ratio Indicator, write to Honeywell Aetonautical Division, Dept. AW-8-168, Minneapolis 13, Minn.

MINNEAPOLIS **Honeywell**

Aeronautical Division

2600 Ridgway Road, Minneapalis 13, Minn.



How the Holley Turbine Control helps jet pilots concentrate on FIGHTING, not flying

Nearly every foot of altitude, gained or lost, nearly every minute change in atmospheric conditions alters the amount of fuel flow needed by today's jet engine. Literally hundreds of mathematical problems must be solved every minute a jet is in the air. It would be impossible for any pilot to solve all these problems and still have time to concentrate on fighting. So the Holley Turbine Control was developed to solve them for him AUTOMATICALLY!

Holley's research department played an important role in the development of this mechanical wizard. But producing Holley Turbine Controls requires special skills, too. Working to tolerances of as little as plus or minus 25 millionths of an inch, the Holley manufacturing division turns out turbine controls for thousands of today's jet aircraft.

Holley's highly-trained research, engineering and manufacturing staff can support your program of producing better products for the aviation industry, either your design or ours.

Leader in the design development and manufacture of aviation fuel metering devices.

HOLLEY Carburetor Co.

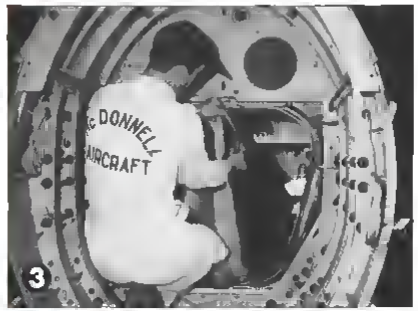
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A-19

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER









B. F. Goodrich device lets a man get in where air cannot

1 ZIPPER FLOOR MAKES PRESSURIZING CABINS EASY. Douglas wanted to pressurize the C-124B's crew compartment. But how to handle the floor? It had to stand a total air pressure of 67,000 lbs. And because there was equipment underneath that required servicing, it couldn't be sealed off with a regular sub floor. B. F. Goodrich engineers devised this rubber sub-floor to do the job. Cables in the rubber give it enough strength to stand 100,000 lbs. pressure. The B. F. Goodrich Pressure Sealing Zipper gives access to equipment yet provides an airtight seal.

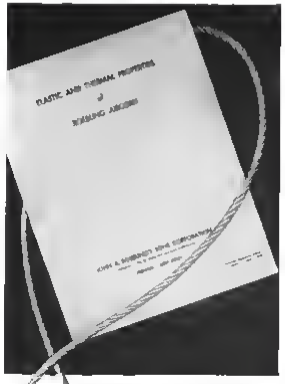
2 SEAL ZIPS OFF TO SAVE TIME. Lockheed engineers needed a seal between the elevator and stabilizer on the Neptune to make control easier. An ordinary fabric seal would work, but dozens of screws would have to be removed every time a control surface was taken off. The B. F. Goodrich Pressure Sealing Zipper proved to be the answer. Its molded lips prevent air flow through the hinge area. Mechanics unzip it in seconds.

3 IT LETS MEN IN—KEEPS FUMES OUT. A standard metal partition between cockpit and fuselage would keep engine fumes out of a jet's cockpit. But it wouldn't let mechanics in unless they removed a lot of screws and bolts. B. F. Goodrich devised a better partition—a fume curtain closed with a Pressure Sealing Zipper. The zipper's rubber lips make an airtight seal, unzip in nothing flat.

4 SHUTS UP TORRENT OF HOT AIR. Designers wanted to make the C-124's hot air duct in six foot sections. They needed a strong, flexible coupling that would permit easy removal of the sections. B. F. Goodrich Pressure Sealing Zippers solved the problem. They resist heat damage, provide an effective seal, open with a zip.

Pressure Sealing Zippers fit irregular shapes. Can be sewn or cemented. They save space, weight, time. Write *The B. F. Goodrich Company, Aeronautical Sales, Akron, Ohio.*

B.F.Goodrich
FIRST IN RUBBER



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THERMAL

properties of

AIRCORD

DESIGNERS AND ENGINEERS find this Roebling booklet the most practical and accurate manual ever printed on the physical characteristics of airplane control cord

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Aviation Week

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Twice the cooling capacity, less than half the weight!

Back in 1941 AiResearch engineers anticipated that high speed airplanes would require extensive cooling. They were first to experiment in this field, and America's first operational jets, the Lockheed F-80's, used AiResearch refrigeration units exclusively.

In the intervening years leadership in this field has been maintained by over 900,000 research and development hours, and by unparalleled experience—42,795 units produced and 15,000,000 operating hours.

Today, one of the new units for jet fighters weighs only 5.8 lbs. as against 16.5 lbs. for the original model, it provides 67 tons of refrigeration against 35 tons. An improvement of more than 400%.

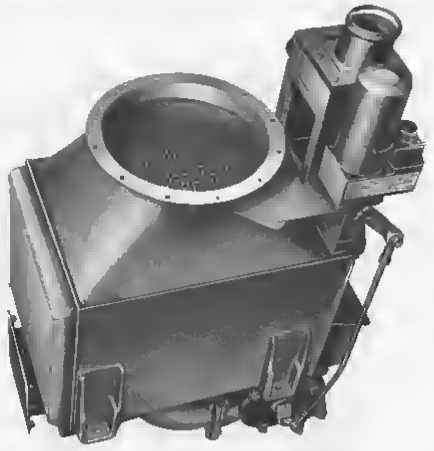
This is another example of how AiResearch improves already efficient products. Its engineers constantly achieve higher performance from smaller units of less weight.

Qualified engineers and skilled machinists are needed now at AiResearch Manufacturing Company, Los Angeles 45, California, or Phoenix, Arizona.

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Designer and manufacturer of aircraft equipment in these major categories







Republic's Thunderflash specifically designed as a virtual "flying camera" is capable of speeds "in excess of 650 mph" — and probably enough faster to slash in and out of enemy territory to get reconnaissance photos without engaging in combat. Air intake ducts are in wing roots so that nose can be devoted to cameras and electronic equipment. Clifford unit (left) keeps camera compartment humidity and temperature at levels that prevent condensation on glass ports

New, Compact Anti-Fogging Unit For The RF84F Camera Compartment

How to put adequate heat transfer capacity into a restricted space was the problem faced by Clifford engineers in developing this anti-fog unit for Republic's RF84F.

• ***Changes in altitude*** and other flight conditions cause variations in the moisture content of the air entering the camera compartment. Low humidity must be maintained to prevent condensation from forming on the glass camera ports. In addition, the compartment temperature must be kept at a certain minimum to insure proper functioning of the cameras.

• ***Key factor*** in the development of the anti-fog unit was Clifford's Wind Tunnel Laboratory — the largest, most completely equipped technical facility of its kind. Empirical data developed over many years of research in aircraft heat exchange problems plus the facilities to simulate accurately the conditions under which the unit must perform resulted in a quick, effective solution to the problem, (see below).

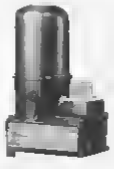
◀ During high altitude flight ambient humidity is normally low and air for conditioning the camera compartment can be taken directly from the engine turbine bleed without danger of camera port fogging.

This air enters at (A), passes through the valve and directly into the compartment distribution duct (● ●).

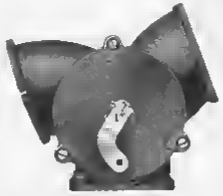
After circulating through the compartment the air is removed through the upper port, (B) to the exhaust duct leading overboard (● ●).

Under flight conditions in which turbine bleed air is humid, the anti fog unit is switched on. The electric actuator (C) positions the diverting valve to direct the moist air up through one side of the heat exchanger (E) where it cools or a warming or cooling medium and then passes directly overboard (——). A small amount, however, is diverted upward through the manifold (F) to a dryer. It then passes into the compartment to replenish air lost through leakage (- - -→). At the same time, a blower mounted at (G) recirculates the existing dry camera compartment air through the other side of the heat exchanger to be either warmed or cooled as compartment conditions require (→ → → →).

Correct pressure is maintained in the compartment by a relief valve located in the upper port (B).



Electric actuator designed by Clifford positions the valve for direct flow of turbine bleed air into the compartment or for diversion through the heat exchanger. It also positions the valve in upper port (B) to close off the manifold to the dryer.



Minimum pressure drop was an important requirement of the diverting valve. A special cylinder type design with careful configuration of passages and precise mating of surfaces resulted in low pressure losses.

▶ Clifford will gladly consult with you regarding your heat transfer problems and put its unique facilities to work developing the *right* solution to fit your requirements.

▶ Write: Clifford Manufacturing Company, 136 Grove Street, Waltham 54, Mass. Division of Standard Thomson Corporation.

7.4.15

Bellows And Bellows Devices

CLIFFORD MANUFACTURING CO. WALTHAM, MASS.

Aircraft Heat Exchangers Valves Electronic Equipment

NEWS DIGEST

Damestic

USAF's vertical takeoff fighter, now nearing completion at Ryan Aeronautical Co's San Diego plant, was inspected recently by Maj Gen Albert Boyd, commander of Wright Air Development Center. He also flew the Boeing B-52A on its second flight and test hopped the lightweight Lockheed XF-104.

Cessna Aircraft Co., Wichita, has won a $5-million USAF contract for a "limited number" of twin-jet T-37A trainers, replacing a $1-million order that covered production engineering and tooling. Prototype T-37A will fly soon.

Beech Aircraft Corp., Wichita, is preparing to bid for a share of guided missile and target drone business, has organized a new division of its engineering department to begin designs. Division head: Dr. James F. Reagan, former chief engineer for Radioplane Co.

Navy's $40-million jet engine plant at Romulus, Mich., will be leased to Ford Motor Co. for non-defense production. The plant originally was built for production of the Westinghouse J40 turbojet. Lease still must be approved by the Defense Department.

New details on Douglas Aircraft Corp.'s DC-8 jet transport are expected to be revealed by vice president-engineering Arthur E. Raymond in a Stockholm speech Sept. 3. He also may discuss Douglas philosophy on jet vs. turboprop.

Jet transports may boost aviation fuel costs to 30% of trunk airlines' overall operating expense, petroleum experts warn. Fuel costs now represent 22% of operating expense.

Convair F-102 will begin armament tests this month at Holloman AFB, N. M.

Pacific Airmotive Corp. has won a USAF contract for C-47 and C-119 overhaul by its Chino (Calif.) division under the Air Force IRAN (inspect and repair as necessary) program. First transport is scheduled to arrive at Chino early next month.

General Electric Co. will build a new laboratory on Stanford University's campus at Palo Alto, Calif., to develop more powerful microwave tubes for missile guidance, radar and communications. The lab will work closely with Stanford, West Coast center for microwave research.

Air Academy was activated officially Aug. 14 under orders signed by Lt. Gen. Hubert R. Harmon, first superintendent of the school, at Lowry AFB near Denver. First class will start next July 1 at Lowry, temporary site. Construction of a permanent $126-million academy at Colorado Springs is scheduled for 1957.

Lockheed Aircraft Corp. is setting up a special C-130 training school for USAF personnel at its Marietta (Ga.) division. First arrivals may check in next month.

North American Aviation plans to build two new facilities on a 56-acre site at Canoga Park, Calif., one for production of rocket engines for USAF, the other for continuing research in atomic energy.

New $1.5-million plant will be built by Babb Co. on a 43-acre site leased from the city of Phoenix at Sky Harbor Airport. The company has contracts for aircraft engine overhaul, is considering production of plastic components for guided missiles.



Convair Tests New Sea Dart in Pacific

Convair YF2Y-1 Sea Dart, a slightly modified production test model of the XF2Y-1, taxis in the open water off Pt. Loma, Calif., during rough water takeoff and landing trials. Fitted with twin hydro-ski landing gear, the twin-jet delta wing flying boat interceptor made four successful landings in the Pacific, then floated into the stern of a Navy landing ship, dock, to demonstrate how it can operate from floating bases.

Financial

General Dynamics Corp., in its first financial report since Convair merged into the company Apr. 30, shows a net income of $8,663,066 for the first half of 1954, a 28% increase over the first six months of last year. Net sales amounted to $291,376,798, compared with $296,898,347.

Curtiss-Wright Corp., Wood-Ridge, N. J., had a consolidated net profit of $7,569,443 for the first half of this year, compared with $5,735,078 for the same period of 1953. Net sales totaled $234,550,689, compared with $205,468,022. Backlog June 30: $783 million.

International

Airwork Viking crashed and burned Aug. 15 during a one-engine emergency landing at Blackbushe Airport near London. The Vickers transport was forced to return to the field after one of its two powerplants failed shortly after takeoff on a charter flight to Nice, France. Six of the 35 persons aboard suffered minor injuries.

Rolls-Royce Avon R.A. 28 now is officially quoted at 10,000 lb. thrust, the first British turbojet engine with an announced rating in five figures.

Dr. Hugo Eckener, dirigible pioneer who commanded the Graf Zeppelin on its round-the-world flight in 1929, died Aug. 14 at Friedrichshafen, Germany. He was 86.

British Overseas Airways Corp. is negotiating with Lockheed Air Service to convert six Boeing Stratocruisers recently purchased from United Air Lines to aircoach configuration.

SKIN PANEL ALLOWABLES INCREASED WITH 75 ST

hi-shears

75ST HI-SHEAR rivets combat "head popping" and wrinkles in skin panels more effectively than 24ST DD rivets. Combining higher material strength and close tolerance heads, the 75ST HI-SHEARS permit higher sheer and tension allowables, reduce shop problems and improve surface flushness.



HS25 rivets with the AN426 styled head permit countersinking to skin minimum thickness of .072 or more. Hole preparation is accomplished with same standard tools.



HS23 with the small HI-SHEAR styled head permits countersinking in thin gauges (.051 min.) and eliminates sub-countersinking or sub-dimpling in frame to-skin attachments, extrusions, stainless steel, titanium or where dimpling clearances are lacking.



HS26 with a flat head attaches thin sheets where bearing is critical. Reduced by 1/3rds the weight of a steel fastener.

- 75 ST HI SHEARS drive with ½ the force of DD rivets and eliminate ice boxing DD rivets.
- 75ST HI-SHEARS use the same standard Sets as used in driving steel HI-SHEARS
- 75ST rivet pin uses on A17ST HS24 collar (dyed blue)

WRITE for the HI-SHEAR Standards Manual.

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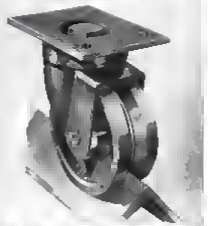
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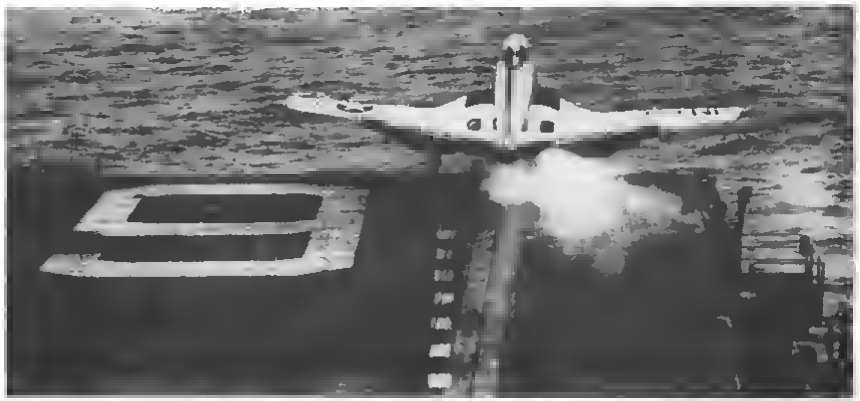
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CHANCE VOUGHT F7U-3 CUTLASS takes off in a cloud of steam during tests of new catapult at Naval Air Materiel Center, Philadelphia. Navy plans steam catapults on 13 of its carriers, including Forrestal-class and ships presently equipped with hydraulic units

Navy Plans Converting Carriers to Steam Catapults



McDONNELL F2H-3 BANSHEE is steam catapulted from USS Hancock marking first time a jet fighter has been launched in this fashion from a carrier. Last December, a Grumman F9F-6 Cougar fighter was steam launched from land-rigged catapult at NAMC, Philadelphia.

GRUMMAN S2F-1, piston-engine anti-sub plane, makes the first steam catapult take off from a carrier. Ship is USS Hancock. Termed the C-11 slotted-cylinder catapult, device was developed by the British and utilizes steam from ship's boilers. A water brake stops the piston





Baeing brings jet speed to tanker-transparts

The sleek new giant in the foreground is the Boeing Stratotanker, the first tanker transport of the jet age. Beside it is the famous Boeing KC 97, standard tanker of the Strategic Air Command.

The new swept wing aircraft, soon to undergo flight tests, was built by Boeing to add jet speed to military aerial refueling and transportation.

This is a prototype model, adaptable to either military or commercial use. The military, *Stratotanker* version will be capable of high speed, high altitude refueling for today's—and tomorrow's—jet fighters and bombers. The commercial, *Stratoliner* version, will bring the west and east coasts within five hours of each other, and will fly non stop from New York to London in less than seven hours.

Although it is the newest American jet, the Stratotanker has behind it the world's most extensive experience in designing and building aerial tankers, as well as large, high performance, multi-jet aircraft.

Boeing is in an excellent position to move swiftly into jet tanker transport production.

The transition from the present type tanker transport to the newer jet can be made without interrupting the continuity of production.

The new Boeing jet tanker transport is backed by the same breadth of research, design and production skill that has made previous trail blazing Boeing airplanes such outstanding performers in the nation's service.

BOEING

WHO'S WHERE

In the Front Office

Sir Reginald Verdon Smith, joint managing director of Bristol Aeroplane Co., has become board chairman of MacDonald Brothers Aircraft, Ltd., Winnipeg, new Canadian subsidiary of the British firm. **R. J. Reynolds**, executive vice president of Bristol Canada, is president of the MacDonald board. **W. S. Haggett** has been appointed executive assistant to the president.

Walter E. Gregg has moved up to vice president and assistant general manager of Rem-Cru Titanium, Inc., Midland, Pa. Also promoted: **Dr. Walter L. Finlay**, vice president and manager of research, **John M. Dempsey**, assistant secretary.

Louis F. Malkovsky has retired as vice president and Foundry Division manager of Sperry Gyroscope Co., division of Sperry Corp., Great Neck, N. Y.

William Lawry has left Acro Engineering, Inc., to form William Lawry Associates, New York, aviation manufactuers' representatives.

Air Vice Marshal Alfred C. H. Sharp, former British Air Ministry officer, has joined Glenn L. Martin Co., Baltimore, to assist in the study and development of foreign markets.

Changes

R. J. Trivison is new production manager and assistant to vice president-operations **Reagan C. Stunkel** of Hydro Aire, Inc., Burbank, Calif., instead of vice president operations as erroneously reported by AVIATION WEEK (Aug. 9, p. 11).

Zeus Soucek has been appointed general manager of the Mechanical Division of General Mills, Inc., Minneapolis.

Max S. Simpson has become assistant controller for Chance Vought Aircraft, Inc., Dallas, and **Floyd E. Peavler** is new internal audit supervisor.

E. D. Burke has been promoted to director of advertising and public relations for the Garrett Corp., Los Angeles. **Ken Frogley** is new public relations manager.

Alton Anderson has been moved up by Cook Research Laboratories, Skokie, Ill., to assistant director. Other changes: **Edward A. Bjorseth**, chief engineer; **Harold V. Hawkins**, present assistant director, will take on additional duties as technical director of the aeronautical section.

J. L. DeDiemar, former Convair designer, has joined Resdel Engineering Corp., Los Angeles, as chief engineer.

Dr. Shao-Wen Yuan, onetime chief of McDonnell Aviation Corp. helicopter research program, has been promoted to research professor in the aeronautical engineering department of Polytechnic Institute of Brooklyn.

Honors and Elections

Dr. John A. Hutcheson, vice president research for Westinghouse Electric Corp., has been elected chairman of the Naval Advisory Research Committee. He replaces **Dr. Augustus B. Kinzel** of Union Carbide & Carbon Corp.

INDUSTRY OBSERVER

► Most of the traditional fighter manufacturers are competing in a USAF design study competition for a long-range, all-weather fighter. Meanwhile, there is considerable debate within USAF on the operational usefulness of a long-range interceptor, because present and contemplated warning systems would not allow sufficient time for such a fighter to make interceptions of enemy bombers at long range.

► **McDonnell, Bell and Ryan are working on USAF design study contracts for a high-performance vertical take-off fighter. The new VTO designs are aimed at performance far superior to either the Navy turboprop projects now flying or the USAF jet projects nearing completion at Bell and Ryan.**

► First Douglas C-133 transport is due off the line at Long Beach, Calif., next summer. The C-133 is being built under the Cook-Craigie initial slow rate of production plan. It is the largest transport now being built in the new USAF family of transports, including the C-123 and C-130. It will be powered by four P&WA T34 turboprops.

► **Pratt & Whitney Aircraft J-57 turbojet models with afterburner for fighter installations are encountering difficulties in cooling the afterburner skin. Skin temperature on the afterburner gets so hot it melts seals in hydraulic afterburner controls actuating cylinders and in the lubricating system.**

► Convair C-131C, powered by two Allison T56 turboprops, recently reached an altitude of 39,000 ft. and a maximum speed of 326 knots (375 mph.) during test flights at Ft. Worth, Tex.

► **Lockheed Aircraft Corp.'s Georgia Division is well along on a study and evaluation of present and future methods of aerial refueling.**

► Pan American World Airways is planning a number of operational improvements on its Boeing Stratocruisers to facilitate nonstop trans-Atlantic operations. Among them is a larger and more efficient turbo supercharger turbine wheel developed by General Electric that reduces back pressure on the engine exhaust.

► **Pratt & Whitney Aircraft has been trying to interest Lockheed and Trans World Airlines in using advanced versions of the Wasp Major on Super Constellations to boost speed in order to match American and United Air Lines' DC-7 transcontinental schedules. Most powerful version of the Wasp Major has been delivering 3,800 hp. on takeoff for military aircraft such as the B-36 and C-124.**

► All single-engine Navy aircraft powered by Allison T40 turboprops were grounded by the Bureau of Aeronautics last week following the crash of a Douglas A2D at Edwards AFB, Calif., due to engine failure. The A2D was a production model from the El Segundo plant on bailment to Douglas. Test pilot George (Swede) Jansen ejected successfully and parachuted to safety. This was the second crash of a T40-powered A2D and the third incident involving major engine failure. The only other single-engine Navy aircraft powered by the T40 are the two VTO fighters, Convair's XFY-1 and Lockheed's XFV-1.

► **Production line at Boeing Airplane Co.'s Seattle plant now is turning out RB-52Bs. Only three B-52As were produced. The RB-52 is more versatile aircraft than the early version. The "R" (indication reconnaissance) designation may be dropped.**

► Brake failure of the Boeing 707 has been traced to a safety valve in the hydraulic system that shut off pressure to the brakes below the debooster. The "safety" device will be removed.

► **CAA Administrator Fred B. Lee reports his office now is studying the possibility of 100% air traffic control between altitudes of 20,000 and 40,000 ft. This would be supplemented by extending airspace control to 100% below 20,000-ft. at those points where it was most urgently required.**

Washington Roundup

ARDC Research Defense

Lt Gen Thomas S Power, Air Research and Development Command chief, probably will offer comments and suggestions following study of a report by the House Committee on Government Operations (Riehlman committee) on military research and development programs (AVIATION WEEK Aug 9, p 15). Look for defense of "in house" research as essential to ARDC if command is to retain a staff competent to judge results of work done by universities and industry. Argument is that top flight scientific brains will not take a job with the government, unless they can do real scientific work.

Aircraft Industries Assn will remain silent on the Riehlman recommendations, although there is some feeling that industry spokesmen should have been heard by the committee. Some companies claim universities are getting too deep into development work in competition with private firms. Washington newspapers carry classified ads of universities trying to outbid aircraft firms in the scramble for engineering talent.

Key Defense Advisor

Robert C Sprague, president of Sprague Electric Co, has emerged as the Administration's key advisor on continental defense matters. He now serves as advisor to the National Security Council and the Senate Armed Services Committee. Sprague presented his first, highly secret evaluation to the committee in January. The committee, in a review of its activities during the past year, said it was "recognized as being most thorough and complete." The report was turned over to the President, who appointed him advisor to NSC.

Naval Aviation Discharges

About 7,200 Naval aviators, now in inactive status and who have not participated in the program for at least three years, will be given honorable discharges in October. Pilots with the rank of lieutenant (junior grade) or ensign are not included in first postwar effort to open up top echelons and create opportunities for promotion. The step is part of a program to tighten up reserve ranks, placing emphasis on qualifications and training.

Airpower Debate

Willingness of top level Air Force officers to go along with the Administration's airpower program is evidenced in the preparation by USAF headquarters of the recent speech made by Sen Leverett Saltonstall defending the airpower program.

Attack by Democrats on the program is being led by Sen Symington, former USAF Secretary (see p 16).

Pacific Route Battle

A rough behind-the-scenes battle—which undoubtedly will be highly colored with politics—is brewing over the issue of renewal of Northwest Orient Airlines' North Pacific route. It raises the old "chosen instrument" issue. If NWA is eliminated, Pan American will have a U.S. monopoly on trans-Pacific operations.

By a three-to-two decision, Civil Aeronautics Board is understood to have voted to keep Northwest in the area. Harmar Denny reportedly is the Republican member who sided with Democratic members Joseph Adams and Josh Lee to swing the vote against PAA.

But top Administration officials are ready to argue for a reversal of the CAB decision by the White House. Undersecretary of Commerce for Transportation Robert Murray, in the interests of cutting down the subsidy bill, reportedly is aligned with this faction. Two key Administration senators, Edward Thye and Everett Dirksen, are ready to fight elimination of Northwest's Pacific operations.

New Missile Pattern

Industry is watching closely the new weapons system management pattern that seems to be emerging from the new Convair missile project. Brig Gen B A Shriever, considered by Pentagon observers to be one of the most able younger USAF development experts, has been moved from the Pentagon to ARDC headquarters in Baltimore to supervise the project as a special assistant to Lieut Gen Thomas Power, ARDC commander.

Satellite Score

Pentagon scare over the observance of two previously unobserved satellites orbiting the earth has dissipated with the identification of the objects as natural, not artificial, satellites. Dr Lincoln La Paz, expert on extra terrestrial bodies from the University of New Mexico, headed the identification project. One satellite is orbiting at about 400 mi out, while the other track is 600 mi from the earth. Pentagon thought momentarily the Russians had beaten the U.S. to space operations.

Nyrop to Northwest

Donald Nyrop, former head of the Civil Aeronautics Board and Civil Aeronautics Administration, is considering an offer from Northwest Airlines' board of directors to become president of NWA. Nyrop, whose main job now is pushing legislation in Washington authorizing permanent certificates for local service airlines, was offered the Northwest presidency before when he headed CAB. He is not expected to give the airline a decision for several weeks.

Air Force Recruiting

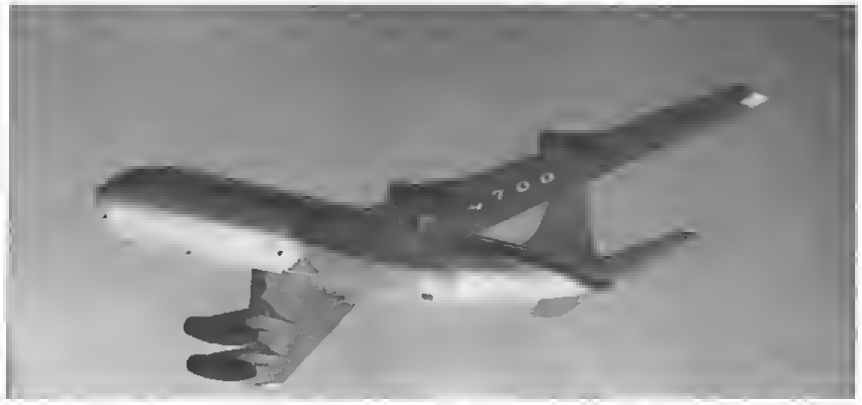
USAF, with $1 million to spend for advertising for recruits, has given the contract to Ruthrauff & Ryan, New York agency. The deal equals in size last year's combined Army Air Force contract with Dancer, Fitzgerald & Sample, agency retained this year by Army with only $500,000 to spend. USAF, forced to depend on volunteers while draftees go to Army, believes the current fiscal year is critical.

Airport Hearing

Latest hope that the issue of a second airport for Washington, D. C., will be resolved lies in hearings planned in about a month by the Senate Interstate and Foreign Commerce Committee. Hearings are being held on the request of Sen John Butler of Maryland, who, along with the rest of the Maryland delegation, favors Baltimore's Friendship Airport as an alternative Washington stop.

—Washington staff

AVIATION WEEK VOL 61, NO. 8 AUGUST 23, 1954



JACKPOT WINNER: to get prototype jet Stratolmer Stratotanker into air ahead of competition, Boeing spent $15 million

Boeing Gets Order for 88 Jet Tankers

- **Company hits $410-million jackpot for 'interim' USAF aerial refueler, bigger and heavier than 707.**
- **Accelerated program calls for building first tanker from production tooling, with no prototype planned.**

By Robert Hotz

Boeing Airplane Co has hit a $410-million jackpot with its $15-million gamble on a jet tanker transport.

USAF has programmed orders for 88 Boeing jet tanker transports. The first 29 will be bought from fiscal 1955 funds at a cost of about $6 million each, including tooling, engines and government furnished equipment, for a total USAF investment of about $174 million.

The remaining 59 will be financed from future USAF appropriations. Accurate cost estimates on this increment are difficult, but it is expected they will run close to Boeing's original quotation of $4 million each for a total of $236 million.

▶ **Juciest Plum**—The scope of the USAF jet tanker program is far in excess of initial indications contained in Air Force Secretary Harold E. Talbott's Aug 5 announcement that USAF had decided to purchase a limited number of Boeing tankers. It confirmed AVIATION WEEK's earlier prediction (July 5, p 11, Aug 9, p 9) that the jet tanker contract was one of the juciest plums now dangling before the aircraft industry.

The size of the USAF tanker program does three things for Boeing:

- Provides a solid production program to follow the long run of KC-97 manufacturing at the company's Renton, Wash., plant.
- Provides production tooling for the jet transport model Boeing hopes to sell to airlines for nonstop trans-Atlantic operation. This will increase further the company's lead over its domestic competitors and pretty well eliminate the time advantage previously enjoyed by its British competitors.
- Provides Boeing with a combination of development and production experience with jet tankers that will make it hard to beat in future USAF competition for the "ultimate jet tanker requirement."

▶ **Superficial Resemblance**—Current USAF orders are for an "interim" tanker that bears only superficial resemblance to the Boeing Model 707 prototype now in the midst of flight testing at Seattle.

Its principal features:

- **Increased gross weight.** The USAF tanker will gross at least 250,000 lb. in contrast to the 190,000 lb. of the Model 707. The 250,000-lb.-plus aircraft is the model that will do nonstop trans Atlantic operations and is the most attractive version for the airline market.
- **Increased fuel tankage and cargo payload.** The interim tanker is aimed at providing aerial refueling for B-52 bombers at altitudes up to 40,000 ft and speeds up to 500 mph. This contrasts to the 15,000-ft. altitude and 250 mph speed of the KC-97 tankers that limit operational performance of B-47 jet bombers.
- **More powerful engines.** Advanced versions of the Pratt & Whitney Aircraft J57 will be used in early versions of the interim tanker, but it is likely that they eventually will be superceded by the 15,000-lb thrust P&WA J75. The J75 still is in the development stage but is expected to begin flight testing soon in a flying test bed rig slung under modified B-45 jet bomber.
- **Longer fuselage.** The interim tanker fuselage will be stretched beyond the 127-ft length of the Model 707 to accommodate larger fuel tankage.

Award of the "interim" tanker to Boeing was made just three weeks before the deadline for an Air Research and

Development Command design competition for an "ultimate" tanker. Five companies including Boeing have spent up to $200,000 apiece on entries in this contest, which has an Aug. 27 deadline. Others are Convair, Lockheed, Douglas and Fairchild.

► **Requirements Yardstick**—Although Air Force says it will continue this competition, it reports nothing about future production awards that might result, noting only that "results of this competition will be used in connection with determining total tanker requirements."

Boeing's competitors believe there will be no production resulting from this competition but that USAF might award a Phase I design contract. Other sources indicated that if any production results from the "ultimate" tanker studies, it will be on the Cook-Craigie slow production buildup plan of only a few planes a month for 18-24 months.

The Boeing interim tanker program will be a full-scale accelerated production program from the start because it is aimed at providing sufficient tankers to service the squadrons of B-52 bombers as they become operational in the Strategic Air Command. There will be no prototype interim tanker. First models will be built from production tooling. Best estimates on initial deliveries are late 1956.

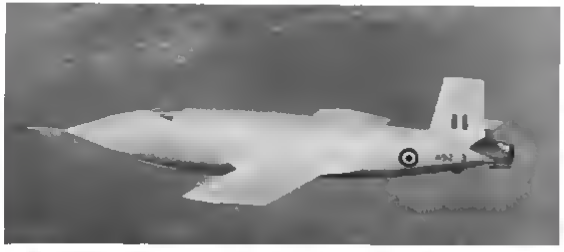
► **Time Edge**—The production tooling provided for a 250,000-lb. plus gross jet transport will be a tremendous help to Boeing in tackling the airline jet market in earnest. Boeing will have to pay USAF for use of this production tooling on commercial transports, just as it paid for similar use of C-97 tooling on Stratocruisers.

However, the time advantage Boeing will gain by this arrangement will make it difficult for any other American manufacturers to launch a competitive commercial jet project.

The USAF decision on the Boeing tanker award has been debated all summer at top Pentagon levels. Both Strategic Air Command headed by Gen. Curtis LeMay, and Air Research and Development Command headed by Lt. Gen. Thomas Power, formerly vice-commander of SAC, backed the Boeing award.

It finally was approved on Aug. 3 by the Air Council and officially announced two days later by USAF Secretary Talbott in a fast action aimed at halting the flood of rumors on the contract leaking in Washington, D. C. around the Pentagon and Capitol Hill.

The procurement directive on the initial order has been sent to Air Materiel Command Headquarters in Dayton, Ohio for execution.





Australia Producing Subsonic Jindivik

The Australian government is producing a quantity of jet-powered subsonic remote-controlled Jindivik pilotless targets, which also are proving valuable in developing high speed guidance systems applicable to guided missiles. Photos of this Jindivik were taken from an accompanying plane at Woomera, secret Australian missile test station. Bottom view shows the target preparing to land with wing flaps down and belly skid extended.

Senate Defeats Move To Kill Aid for RAF

An attempt by Sen. Henry Dworshak to eliminate $35 million for British aircraft for the Royal Air Force from the foreign aid program failed in a Senate voice vote.

"The effect of the support which we are now giving the Royal Air Force is to enable the British government to subsidize the development of commercial jet transports, both passenger and cargo, to compete with our own aircraft industry and international airlines," Dworshak said.

► **Dirksen Defense**—Successful defense for the $35 million was led by Sen. Everett Dirksen, who told the Senate: "The Canberras, the Swifts, the Hawker Hunters and other planes may have had some defects in them several years ago, but it was testified that those planes are now proved. Certainly, Gen. Alfred Greunther testified he wants these planes as front-line fighters."

The Senate's action made the funds an issue to be resolved by a joint House-Senate conference committee, since the House did not provide for the program.

► **Diverted Budget**—Under the $35 million "forces support program," the U. S. would supply Great Britain with $35 million in surplus agricultural commodities. Great Britain would divert this amount of its budget to finance additional aircraft for RAF.

In addition to the $35 million, the foreign aid appropriation earmarks approximately $150 million to military support for Great Britain, a sizeable portion of which would go to offshore procurement of British aircraft for RAF and other NATO forces.

The exact amount hinges on the application of congressional cuts by Foreign Operations Administration. FOA had planned $163 million in British military assistance for fiscal 1955.

KLM Buys Three Lockheed 1049Gs

KLM Royal Dutch Airlines has purchased three Lockheed 1049G Super Constellations featuring increased takeoff and landing weights over previous models. Delivery is scheduled early 1956.

The new order increases KLM's Super Connie purchases to 16, including 1049C and 1049E configurations. Three 1049Es are to be delivered by the end of this year.

The 1049G will have a takeoff weight of 137,500 lb. and landing weight of 113,000 lb. compared with 133,000 lb. and 110,000 lb. respectively for previous models. The new craft also is said to have provision for wingtip auxiliary fuel tanks to extend range.

IAS Turbine Meeting Draws 500

First national jet-turboprop forum hears papers on Boeing 707, noise, takeoff and braking problems.

Seattle—A crippled brown and yellow jet aircraft cast a long shadow in Seattle last week, a shadow that stretched from the Boeing Airplane Co.'s plant to the Hotel Benjamin Franklin, where more than 500 members of the Institute of the Aeronautical Sciences gathered for the first national turbine powered air transportation meeting.

Turnout for the session was almost double that expected and included some of the top names in the aircraft industry. Throughout the three days of discussions on jet and turboprop transports, all members were acutely aware that the first U. S. jet transport already was in existence in a hangar only a few miles away.

► **'Stopping Large Jets'**—Although grounded by the landing accident that forced Boeing Airplane Co. to call off a scheduled flight demonstration (AVIATION WEEK Aug. 16, p. 377), the Model 707 Stratoliner was the focus of attention at the turbine meeting.

Three of the most interesting papers were delivered by Boeing engineers and dealt with the 707 design. No one, it is certain, was more aware of the crippled 707 than Boeing project engineer John E. Steiner, faced with delivery of a paper entitled "Stopping Large Jet Airplanes."

After opening his talk with a slide of the 707 on its nose, Steiner commented wryly: "This is not the way we recommend."

Another well aware of the significance of the new Boeing jet was S. Scott Hall, head of the British Joint Services Mission to the U. S., who was chairman of the opening session.

"I have viewed the 707 and I am duly impressed," he commented, adding that the Boeing jet transport "poses a serious threat—offers very strong competition to the British jet Comet."

► **Jet Problems**—Several themes common to a number of the technical papers emphasized problems faced by jet and turboprop aircraft in the U. S. These included:

- Noise level.
- Takeoff performance on runways at high altitudes and/or on hot days.

"Noise is probably one of the biggest deterrents to acceptance of jet transports by top management today," said M. G. Beard, assistant vice president research and development for American Airlines. "We just will have to tackle this problem of noise. . . . We engineers have to get busy and reduce the noise we inflict on our good neighbors on the ground."

► **MATS About Face**—The paper that drew the most comment was delivered by Lt. Gen. Joseph Smith, commander of the Military Air Transport Service. In what many regarded as an about-face in his views, Gen. Smith emphasized MATS' need for jet and turboprop aircraft.

MATS will need both types of turbine powered airplanes rather than any single multi-purpose type, he said. The MATS commander said the old concept of one multi-purpose military transport is no longer sound.

"We need two types of turbine powered transports," he commented, adding that MATS will use jet transport for personnel, wounded, whole blood, nuclear supplies, perishables and anything else needing special care and speedy transit. Turboprop transports will be used for bulky, less fragile freight.

"It is our opinion that we are now in the jet era," Gen. Smith said. "Because all the combat forces will eventually be all jet, it is inevitable therefore that the transports will also be powered with turbines in order to be harmonious and compatible with the tactical units which we will support in peace and war."

► **Advanced Compressors**—Principal gains in turbojet performance for transport applications will be realized by the use of better or more advanced types of compressors, reported Bruce Lundin, associate director of Lewis Flight Propulsion Laboratory, National Advisory Committee for Aeronautics.

He said advanced compressor designs now being studied offer promise of considerably increasing both the pressure ratio per stage and the efficiency of compressors.

Because these compressors operate at higher relative speeds, the flow capacity is also increased—thus providing a greater thrust output for a given size engine," he commented.

This will provide important reductions in engine weight, he said.

"These aerodynamic advancements, together with the continuous improvements in structural design being energetically pursued by our engine manufacturers promise, I believe, the possibility of reductions in specific engine weight of as much as 50% in the near future," Lundin said.

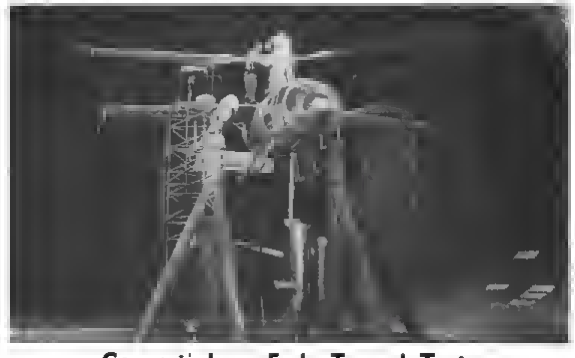
He cited one example in which such a lighter, more efficient engine could achieve the same payload and range with a reduction in total airplane weight of as high as 12%.

► **Fuel Restrictions**—Shell Oil Co. fuel specialists warned that the airline industry must avoid prohibitive restrictions on fuel that could put jet transport operation out of reach economically.

Assuming an industry consumption of 100,000 barrels a day, they said the difference in price between commercial kerosene and a special low pour point kerosene could be as much as $38-million a year.

"This figure represents a significant part of the annual profits now realized by the airline industry," they noted.

► **New Criteria**—Boeing engineers G. S.



Convertiplane Ends Tunnel Tests

McDonnell XV-1 reconnaissance convertiplane, built under an Army Air Force program, underwent extensive tests in this full-scale windtunnel prior to starting a flight development program. For hovering and vertical flight the XV-1 uses pressure jets at the tip of its three rotor blades. A 550-hp. Continental piston engine drives a pusher prop for high-speed flight. Tail is supported by booms extending from wings.

Schairer and M L Olason warned that for the jet airplane the takeoff speed is in a region where climb capability could deteriorate very rapidly with a small decrease in speed

"The choice of takeoff speed, therefore, would be very critical from the pilot's standpoint," they said "If he were to misjudge his speed as to lift off a few knots too soon he could encounter a condition where no climb is available"

They suggested that perhaps a new criterion for the choice of takeoff speed is in order for the jet airplane, perhaps using some factor referenced to the speed for zero rate of climb at takeoff

▶ **Superior Successor**—Donald L Elder, aerodynamics engineer of the Douglas-Long Beach Division, said flight testing of the YC-124B at Edwards AFB is paving the way for its "vastly superior" successor the C-133A, now in production at Douglas

He said the C-133A is a completely new design that will take full advantage of the turboprop in meeting tomorrow's air cargo needs It is powered by advanced versions of the Pratt Whitney YT34 P-1 and Curtiss Wright propeller developed on the YC-124B, he said

Elder said the C-133A will have greatly increased performance and capacity, with a fully pressurized fuselage, truck-bed height cargo floor, drive-in tail loading ramps and many other new features

Lockheed research specialist Harold B Crockett reported that Lockheed's Model 1249 turboprop Super Constellation will have slightly less range than the 3,000 mi maximum power cruise of the 1049 even with wingtip tanks But the 1249 will have 85 mph greater cruising speed, with a maximum of 415 mph at 16,000 ft, he said—WJC

Nine Aircraft Firms Win Tax Amortization

Certificates of necessity, authorizing accelerated tax amortization benefits, were awarded to the following concerns for facility expansions in the amount listed, during July 14-28

Lockheed Aircraft Corp Burbank, Calif. Missile System Division for research and development $415,723

D L Smallwood Co., Dallas for aircraft components $81,189

Solar Aircraft Co San Diego for aircraft parts $207,894

Bomac Laboratories Beverly, Mass for electronic products, $126,030

Fairchild Engine & Airplane Corp., Hagerstown, Md Guided Missiles Division for ordnance $123,855 Stratos Division, for aircraft parts $111,168

AiResearch Manufacturing Co of Arizona, Phoenix for research and development of aircraft parts $350,006

Fisher Governor Co, Marshalltown, Iowa, for scientific and technical instruments for defense, $1,595,000

Bendix Aviation Corp., for aircraft parts, $106,346

Humble Oil & Refining Co., Baytown, Tex., for aviation alkylate facilities $473,806

Slow Buildup Hit

- **Symington leads attack on 'leisurely' program.**
- **Challenges Saltonstall's defense of air policy.**

Sen Stuart Symington, backed by Senate Democrats, continued his barrage against the present airpower program charging that the Administration seems "to find nothing but satisfaction in slowdowns, stretchouts, arbitrary manpower ceilings, reductions and contract cancellations"

Symington's latest attack challenged, point by point, a recent floor speech defending the program by Sen Leverett Saltonstall, chairman of the Armed Services Committee and a top Administration spokesman (AVIATION WEEK Aug 16, p 37)

▶ **'Rosy Optimism'**—"It was calm," Symington commented on Saltonstall's address "So calm, in fact, I was reminded of the rosy optimism which prevailed in 1950 just prior to the outbreak of the Korean war

"I cannot agree, however, that the appraisal was either objective or nonpartisan Most of it apparently was designed to criticize the program of the previous Administration, which called for a rapid buildup and to praise the present Administration's program of a slow and leisurely buildup"

Symington characterized as "clauming that subtraction is really addition" the Administration's contention that its program has increased the strength of the Air Force after "cutting USAF's budget by $5 billion, cutting its personnel by a quarter of a million and canceling more than $2 billion in plane contracts."

▶ **Point by Point**—Statements by Saltonstall that Symington contested

- Production of new plane models--such as the F-100 supersonic fighter, the B-52 long range bomber and the B-66 short-range bomber—are proceeding satisfactorily

Saltonstall is "easily satisfied," Symington declared, "because now it is common knowledge that Soviet Communist production of comparable new types of aircraft is improving faster than ours

We have far fewer F-100s than the Communists have MiG-17s and thousands fewer B-57s and B-66s than the Reds have Il-28s"

He said the Air Force has no production model B-66s and only one production model B-52

- Under the Truman Administration program for 142 wings by mid 1955, after the big expansion of aircraft production, there would have followed "a sudden and drastic reduction in production . . to the point of practically closing down the industry"

Commenting that "this hardly makes sense," Symington declared "The aircraft production required to sustain 143 wings would be the same regardless of the time when the 143 wings were attained."

- "The number of combat wings is the same (in the two programs), but the composition of the force has been significantly altered The number of air defense wings has been substantially increased"

Symington complained that Saltonstall failed to mention that "the number of offensive wings has been decreased by an an equal amount

"The significance of this," he said, "is that the increase in Russian air striking power has already forced us to some what shift our own emphasis from of fense to defense Such a tiend can be fatal in warfare because you do not score while you are on the defensive All you can do is postpone defeat"

- Intensive "work" is being done to hasten development of long range missiles and lack of funds is not a limiting factor

"Even a casual investigation would prove that we are not even close to an all-out effort on intercontinental missiles" the former Air Force Secretary declared "In view of the evidence that the Communists are at least even with us how can anyone say that we are doing everything possible?"

Modified NAA TF-86 Makes First Flight

Los Angeles—North American Aviation's modified TF-86 two-place trainer has made its first test flight.

First prototype was lost in a crash on a demonstration tour in March

Changes incorporated in the new aircraft include installation of two 50 caliber machine guns, a larger dorsal fin and added ventral fin resembling a sailboat's keel This is said to give better directional stability A raised rear seat and foldable front seat head rest improve instructor visibility

The trainer has a basic F-86F airframe with a tandem cockpit, dual controls and duplicate instruments

North American says only two airframe changes were necessary to compensate for the modifications the fuselage section between the nose and wing roots was extended 63 in, and the wings were moved forward 8 in

NAA says tooling and assembly line facilities of the F-86 can be used for the trainer if it is ordered into production The company rates the TF-86 in the 650-mph class, with a maximum service ceiling of 45,000 ft

Turbo-Liner Bid

- **Allison puts turboprop 240 on publicity tour.**
- **Demonstration designed to offset Viscount gains.**

By Bern Lang

Los Angeles—Allison's Turbo-Liner last week was on a flight demonstration tour obviously designed to offset British turboprop publicity resulting from Capital Airlines order for Vickers Viscounts (see p. 55).

U S aviation writers got their first ride on the turboprop transport, a converted Convair 240 powered by 2,925-hp Allison T38s, during its stop here

Although neither Allison Division of General Motors nor Convair said the tour was a result of the British invasion, it was apparent that the Capital Airlines purchase prompted the demonstration

▶ **Impressive Performance**—It was the first press demonstration of the Turbo-Liner since its maiden flight in December 1950 Since that time, it has made more than 350 flights—225 of these for engineering test purposes but never with the press aboard

"Newsmen were amazed at the swiftness of the takeoff and the relative quietness inside the transport once it was in the air," reported the Los Angeles Times "Actually the only noise came from the propellers There was only a slight, high pitched singing sound caused by the engines"

Other press comments included 'quieter, smoother, faster"

To AVIATION WEEK's staff representative, the demonstrated short field performance was impressive

Scheduled stops on the flight tour included both military bases and airframe companies

▶ **'Turbopropaganda'**—In addition to rides on the Turbo-Liner, newsmen also were given a rapid barrage of facts and figures from Convair and Allison on U S turboprop development, described by one reporter as "turbopropaganda."

Allison officials said the Turbo-Liner has a faster rate of climb and cruises approximately 20% faster than similar aircraft with piston engines

"However, with the newer Allison T56 turboprop engines, much further performance improvements can be shown over present commercial aircraft," the company claimed

In stressing turboprop advantages, Allison officials said piston engines of late design develop about one horsepower for each pound of weight, compared with about two horsepower per pound for turbines

▶ **Turboprop vs. Jet**—J C Zevely, Convair director of contracts, commented that turboprop aircraft will be more efficient for short and medium-haul airline routes than turbojet planes

He said the very small speed advantage of turbojet planes is far outweighed by the turboprop's savings in fuel costs, an economic advantage he believes will make the turboprop a key factor in airline plans for future equipment

After emphasizing that two converted Convair 340s, designated C-131Cs and equipped with Allison T56 turboprop engines, are being tested for the U S. Air Force at Convair's Ft Worth plant, Zevely said the company is studying carefully the application of turboprop engines to airline transports

Turboprop powerplants figure prominently in Convair's future plans, Zevely said, with the experience gained in flying the C-131Cs serving as a pattern for possible later conversion of 340s into Turbo-Liners by domestic and foreign airlines.

The Turbo-Liner tour included stops at Lockheed Aircraft Corp, Convair-San Diego, Douglas-Long Beach, North American Aviation Northrop Aircraft, Douglas-El Segundo, Edwards AFB, Strategic Air Command Headquarters, Offut AFB, Nebr; and Air Defense Command Headquarters, Ent AFB, Colo

The plane was scheduled to return to the Allison plant in Indianapolis by Aug 20

Convair Missile Site

New guided missile test facility is being built by Convair on a five-acre government site at Ft Rosecrans near San Diego Estimated cost $250,000.

Convair 340 May Get British Turboprop

Convair seriously is considering the use of a British turboprop engine in its Model 340 airframe to meet the mounting challenge of the Vickers Viscount in the international airline market

Convair is aiming its turboprop-powered versions of the Model 340 at the following markets

- International airlines
- Royal Canadian Air Force for transport use in the Arctic
- USAF for special mission aircraft

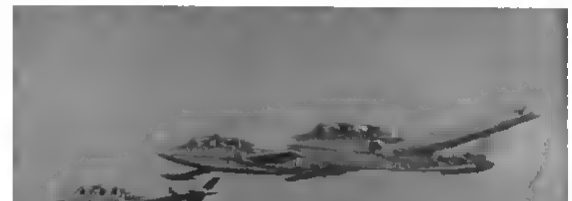
Leading the British engines being considered by Convair is the Rolls Royce Dart powerplant for the competitive Viscount. Convair is making studies of a Model 340 using four Darts instead of either two Pratt & Whitney Aircraft R2800 piston engines or two Allison T56 turboprops.

▶ **Cost Comparisons**—Westinghouse Electric Corp, now bound by a technical and commercial interchange agreement with Rolls, has indicated its interest in building the engines in this country if Convair develops a production program for the four-engine 340.

The Dart is being developed to 1,550 esph plus 360 lb thrust It costs about $40,000 compared with approximately $125,000 for the commercial version of the T56 Cost for 340 operators would be about $160,000 for Dart equipment, compared with $250,000 for the T56.

Convair also is considering two 3,000 esph British turboprops for a twin-engine configuration—the Napier Eland and the Rolls Model 109 Convair pretty well has given up any hope of getting a commercial aircraft out of its T56 powered C-131C in time to compete with the Viscount in the airline market

Its main reasons for turning to the



French Jet Trainers Hit Mach .82

This trio of two jet Fouga CM 170R Magister two-place trainers was a feature attraction at the recent NATO air show in France, where they attained speeds of Mach .82 several times. During the three-day show, the planes made 35 flights with military pilots of U S, British, Italian, Greek and French air forces and several French officials. Fouga is powered by two 836-lb thrust Turbomeca Marbores

Rolls Dart is the fact that it is a service-proven engine that has been operating for 18 months in regular airline service, while the Allison turboprops still are in the development stage and lack any service test experience.

▶ **340 vs Viscount**—In addition to competing against Vickers for new airline orders, Convair is anticipating the problem of U S domestic lines flying 340 fleets in competition with Capital Airlines' Viscounts. It is after a solution to this competitive problem within 18 months.

Meanwhile, Convair sold 36 cargo versions of the 340 to the Navy. Designated R4Y, they will have a 10-ft cargo loading door, floor stressed for 200 lb and a 20-in grid pattern for cargo tie down.

Convair also has sold 33 transport versions of the 340 to USAF for $20 million, and all planes will be delivered by April 1955.

Horner Sells 1,200 UAC Common Shares

H Mansfield Horner, president of United Aircraft Corp, has sold 1,200 UAC common shares, leaving a total holding of 4,800, according to Security & Exchange Commission's latest survey of stock transactions.

Acquisition of 500 General Motors Corp common shares by Roger Kyes, former Deputy Secretary of Defense, also is reported.

Other transactions for the mid-June to mid-July period:

Aero Supply Manufacturing Co Acquisition of 2,500 common shares by Henry Margolis director making a total holding of 27,700.

Air Associates Purchase of 500 common shares by J E Ashman director making a total holding of 1,050.

Alaska Airlines. Acquisition of 1,000 common shares by Roland Place director making a total holding of 1,400.

Arc Equipment Corp Acquisition of 400 common shares by Ralph McConnell director making a total holding of 8,271.

Bendix Aviation Corp. Acquisition of 600 common shares by Raymond Lansing director, making a total holding of 1,242; purchase of 300 common shares by W. H. Houghton director making a total holding of 835.

Boeing Airplane Co Disposal of 102 common shares by James F Murray officer leaving a holding of 154.

Braniff Airways. Acquisition of 200 common shares, by Walter Hensbel, officer, his total holdings purchase of 400 common shares by George Rice director making a holding of 800.

Capital Airlines Purchase of 500 common shares by James Austin officer making a total holding of 10,500.

Colonial Airlines Acquisition of 302 capital shares by B T Dykes director making a total holding of 802.

Curtiss-Wright Corp Acquisition of 100 common shares by F W Mencik officer, his total holding.

Eastern Air Lines. Sale of 200 common shares by Sibyl-vesani Peabody director leaving a holding of 100 shares.

Flying Tiger Line Disposal of debentures valued at $10,000 by James Davidson director leaving a holding valued at $90,000.

General Dynamics Corp Acquisition of 1,700 common shares by Robert Meikiejohn officer making a total holding of 2,105.

General Motors Corp. Disposal of 300 common shares by Harlow Curtice president, leaving a holding of 14,572 shares; sale of 200 common shares by Nelson Deterdorf officer, leaving a holding of 1,050; disposal of 285 common shares by Paul Garrett officer leaving a total holding of 1,459; disposal of 300 common shares by John Gordon officer leaving a total holding of 1,555; sale of 1,000 common shares by John Schumann leaving a total holding of 24,468.

Lockheed Aircraft Corp Disposal of 1,500 capital shares by Burl Mosesmith officer, leaving a holding of 2,542.

Glenn L. Martin Co. Acquisition of 2,000 common shares through exercise of option by William Bergen, officer making a total holding of 2,154; purchase of 2,000 common shares by Edward Uhl officer through exercise of option his total holding, acquisition of 2,000 common shares by George Willey officer making a total holding of 2,312.

Pan American World Airways. Disposal of 300 common shares by R G Ferguson officer leaving a holding of 732.

Piper Aircraft Corp Acquisition of 4,000 common shares by Norman Greene, director making a total holding of 10,000.

Raytheon Manufacturing Co Acquisition of 1,000 common shares by Carl Gilbert director making a total holding of 1,200.

Seaboard & Western Airlines. Disposal of 400 common shares by Arthur Nordeo director leaving a holding of 30,021; sale of 900 common shares by John Rosenwald officer, leaving a holding of 52,575.

Solar Aircraft Co Acquisition of 500 common shares by Leon Noel officer his total holding.

United Aircraft Products Purchase of 500 common shares by Joseph Morris, officer his total holding.

New Peace Talks Fail In AA Pilots' Strike

New peace talks between American Airlines and Air Line Pilots Assn, called by National Mediation Board in a second attempt to settle the protest strike over extending the eight hour flight time rule, broke off abruptly last week with no solution in sight. No further talks were scheduled.

C R Smith, American president, said in a prepared statement: "The several meetings with ALPA have been fruitless in producing a solution to the problem. It remains the position of the union that there will be no non stop transcontinental service at this time."

▶ **Alternatives**—The airline revealed that NMB member Leverett Edwards, had listed four points which must be settled first between the two parties.

The points and American's attitude:

• **Return to duty.** "We agree that the pilots will be returned to duty as their services are required for the operation of the schedules."

• **No recrimination** "We agree that there should be a no recrimination provision with an obligation on each of the parties to respect it."

• **Eight hour rule.** "We agree that we will write a binding commitment with the association (ALPA) which will provide (1) The company will not assign pilots to fly more than eight scheduled hours on flights with scheduled intermediate points or otherwise but (2) the obligation of the pilots to operate the nonstop transcontinental services is recognized."

• **Arbitration** "We agree that we will, under the terms of the Railway Labor Act, arbitrate this (1) the legal right of the company, under the terms of its contract with ALPA, to operate the nonstop transcontinental services, (2) whether or not the union has violated its contract by this strike; (3) if the union has violated its contract what will be the responsibility for damages resulting from its strike."

ALPA's views on the four points were not immediately available.

▶ **Court Decision**—The three points made under the arbitration proposal are now before the Federal District Court in New York for decision in AA's $1,250,000 suit against the union.

"We would prefer that they be settled by such court ," Smith said. "If, however, Air Line Pilots Assn would prefer that the issue not be settled by the court but be judged by arbitration instead, that is agreeable with us under the conditions named."

▶ **Shutdown**—Meanwhile, American began disbanding its operations by laying off 1,891 stewardesses flight engineers and probationary employes and sending two-week notices to 13,821 others.

Smith earlier notified the 1,243 striking pilots that they had been suspended from the airline's payrolls effective July 30 when the strike began. Their seniority as pilots stopped accruing Aug 15, he said.

Dismissal of employes would save the airline $7 3 million a month including salaries of the pilots Smith said.

ALPA maintained last week that all American had to do to stop the strike was to arrange for crew changes on the three DC 7 nonstop transcontinental east-west flights.

ODM Sets Titanium Goal at 37,500 Tons

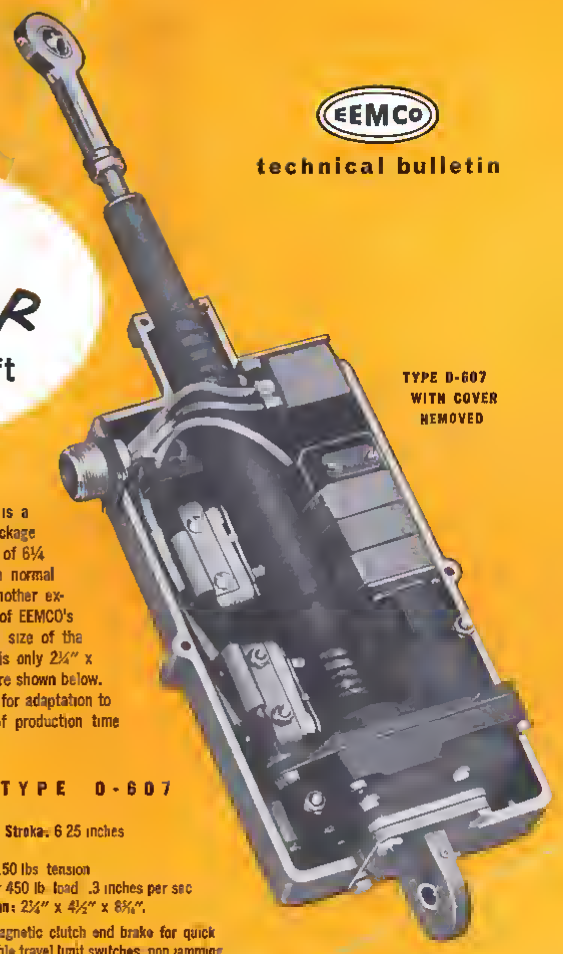
A goal of 37 500 tons annual capacity for titanium processing facilities has been established by the Office of Defense Mobilization.

Certificates for rapid tax amortization benefits will be awarded to meet this goal by 1956 ODM established an identical 37,500 ton capacity goal for titanium ingot in February.

"At present there are not processing facilities in operation designed specifically for the production of titanium mill products," ODM says "Because of the absence of such facilities, the industry has relied for its mill products on plants designed for stainless steel production It is expected that both improved quality and reduced costs will result from processing facilities especially designed for the metal."

a New DOOR ACTUATOR for Transport Aircraft

EEMCo technical bulletin



TYPE D-607 WITH COVER REMOVED

EEMCO's new linear actuator, Model D-607 is a compact combination actuator and power package weighing only 4½ pounds Having a stroke of 6¼ inches at .3 inches per second under a normal operating load of 450 pounds, it is another example of the ingenuity and precision of EEMCO's design and production team. Overall size of the activating section of Model D-607 is only 2¼" x 4½" x 8⅝". Other specifications are shown below. This same design can be altered for adaptation to other uses with a minimum of production time thus assuring early delivery.

SPECIFICATIONS ★ TYPE D-607

Weight. 4 5 pounds Stroke. 6 25 inches
Operating load: 450 lbs
Ultimate static load: 7150 lbs tension
Speed of stroke under 450 lb load .3 inches per sec
Size of power section: 2¼" x 4½" x 8⅝".

Other features: Magnetic clutch and brake for quick stopping; adjustable travel limit switches, non jamming end stops; radio noise filter; explosion proof.



NOTE COMPACTNESS OF COMPLETE UNIT

Electrical Engineering and Manufacturing Corp.

4612 West Jefferson Boulevard
Los Angeles 16, California

Designers and producers of motors, linear and rotary actuators

D-607



COLLINS is in on another FIRST

With an eye to the future and improved passenger service, Mohawk Airlines inaugurated helicopter passenger service on its route between New York City and Sullivan County in the Catskills vacation land on June 7th.

This is the first time a scheduled airline has used the helicopter to serve a community (Liberty/Monticello) for which it had been certificated by the CAB but had been unable to serve due to lack of an adequate DC-3 airport.

First local service airline to operate a helicopter, Mohawk operates the longest non-stop helicopter run in the world.

Mohawk expects to replace the Sikorsky S-55 and its 11 plush DC-3s with twin-engine 40-passenger rotorcraft in a few years, said President Robert E. Peach.

Collins is proud to share in these important "firsts." Mohawk's Sikorsky S-55 transport is equipped with Collins VHF Communications Receiver and VHF Transmitter.

In winged aircraft and helicopters, Collins flies with Mohawk Airlines — furnishing accurate, dependable communications on every flight.

COLLINS RADIO COMPANY CEDAR RAPIDS, IOWA

261 Madison Avenue, NEW YORK 16 • 1930 Hi-Line Drive, DALLAS 2 • 2700 W. Olive Avenue, BURBANK

COLLINS RADIO COMPANY OF CANADA, LTD., 74 Sparks Street, OTTAWA, ONTARIO



DESIGN SIMPLICITY for easy maintenance, continuous flying is feature of new Fletcher

Fletcher Unveils FU-24 Duster

New Zealand orders 100 all-metal 'Utilities,' designed to lift 1,250-lb. loads from 870-ft. strips.

By William J. Coughlin

Rosemead, Calif.—Fletcher Aviation Corp. has unveiled its FU-24 agricultural aircraft and announced an order from New Zealand for 100 of the utility planes.

The initial contract with the Cable Price Corp., Auckland, covers the prototype aircraft now flying, 11 fully assembled planes and 89 complete kits to be assembled in New Zealand.

▶**Fletcher's 'Utility'**—The all-aluminum aircraft, powered with a 225-hp. Continental engine, has a 42-ft. wing span, 31-ft. 10-in. length and an empty weight of 1,909 lb. It is designed to lift a 1,250-lb. load from an 870-ft. unimproved flight strip.

A 27-cu.-ft. hopper for other cargo is aft of the single-place cockpit. Fletcher has named the plane the "Utility."

The prototype made its first flight July 14.

▶**40-G Safety**—Fletcher says unique features of the aircraft include an all-movable elevator system for ease of control at slow speeds, a 40-G safety section around the pilot and a complete coating of plastic paint to protect it from corrosion effects of the chemicals it will carry.

The company says the cockpit has withstood loads equal to flying the fully loaded aircraft into the ground at a 45-deg. angle at 70 mph.

Operational gross weight is 3,478-lb. and top speed is 124 mph. Cruising speed is 108 mph. with a range of 370 mi. Sea level rate of climb is 750 fpm, service ceiling 15,700 ft. Tricycle gear is not retractable.

▶**Pilot's Airplane**—"This is probably the least romantic aircraft I've ever worked on, but it will carry more weight per horsepower than anything I know of," says project engineer John Thorp. "Since high speed was not important, we have been able to put all our efforts on heavy load carrying and short field takeoff runs.

"The Utility has been designed as a pilot's airplane to take care of a tired pilot who has been flying from dawn to dusk. With its wide tricycle landing gear, rough field landings every five minutes should be no problem."

Tailor-made for agricultural needs, the "Utility" is designed with emphasis being placed particularly on slow flight characteristics, visibility and rugged construction.

▶**CAA Tests**—Both U. S. and New Zealand civil aeronautics officials have conducted static tests of all components of the aircraft. Fletcher reports the complete aircraft has been tested to 150% of the 3.8 load limits required by Civil Aeronautics Administration.

A cooling system similar to that of the Fletcher FD-25 will relieve the pilot of overheating problems, the company says. The fertilizer hopper, located on the center of gravity, is coated with a polyvinyl Saran plastic that is resistant to the acids and abrasion of superphosphates.

▶**Kit Shipments**—James Aviation, Ltd., Hamilton, N. Z., will assemble the 89 aircraft kits that are being shipped to that country. These kits are fabricated by "matched hole tooling," which Fletcher says will eliminate costly jigs for final assembly.

Cable Price Corp. will handle sales of the new aircraft. The firm is the merchandising organization of the William Cable Holding Co., second largest importing and distributing organization in New Zealand.

Cable Price already has sold five of the agricultural aircraft to Robertson Air Service, Ltd. of Hamilton, N. Z.

▶**'Top Dressing'**—The order for 100 of the Fletcher aircraft emphasizes the importance of the "top dressing" industry to New Zealand. Last year, nearly 180 surplus training planes and converted small passenger planes spread an estimated 200,000 tons of superphosphates over the soil.

Operation of converted aircraft at small, unimproved strips resulted in a high accident rate.

More than 100 of these planes suffered major damage and 16 were demolished in a three-year period. Seven pilots were killed.

To New Zealanders, "top dressing" means the aerial application of chemical fertilizer over steep hillsides and bears little resemblance to crop-dusting operations in the U. S.

Pilots fly at an altitude between 50-300-ft., and the average flight takes only three and a half min. With automatic loaders refilling the aircraft, it is not unusual for a pilot to make over 240 sorties a day.

▶**First Shipment**—Fletcher has completed a 123,000-sq-ft. concrete factory building on its 213-acre Rosemead Airport property for production of the FU-24. Shipment of the prototype and the 10 assembled aircraft is to be completed by Nov. 15. The first kit is to be shipped on that date with kit shipments every month until the order for 100 Utility farm planes is filled.

Other Fletcher aircraft turned out since World War II include the FD-25 Defender, now being produced by the Toyo Aircraft Co. in Japan and the FL-23 observation aircraft.

Pike Warns of Growing Jet Lubricant Needs

Manufacturers of synthetic lubricants for jet engines were warned last week they must increase production facilities to meet fast-growing military demands.

Thomas P. Pike, Assistant Secretary of Defense for Supply and Logistics, forecast that 1,705,000 gal. will be purchased by the Defense Department in the next three years and that the quantity will increase substantially after 1957. The lubricants meeting military specification MIL-L-7808B, are used in jet bombers, fighters and interceptors.

Pike said military requirements for the next three fiscal years will be: 1955, 250,000 gal.; 1956, 601,000 gal.; 1957, 854,000 gal.

His prediction of a fast growing need for more lubricants parallels a Defense Department estimate that jet fuel requirements also will increase rapidly as reciprocating engines are replaced by jets for military operations. (AVIATION WEEK June 7, p. 16)

Japan Airpower

● Blueprints for postwar buildup near completion.

● First squadrons to form before July of next year.

(McGraw-Hill World News)

Matsushima, Japan—U. S. Air Force and Japanese military leaders now are completing final blueprints for this country's postwar airpower buildup, with from five to seven squadrons scheduled to become operational by July 1955.

The men who will lead this air force are finishing the first two-month refresher training course here under USAF instructors. Barring unforeseen obstacles, the 35 officers of this class and others who are to follow them this year will take over the first squadrons and operate several air training schools.

Buildup plans from now through the first half of next year call for formation of two or three F-86 fighter squadrons, two C-46 transport squadrons and one or two P2V anti-submarine patrol squadrons.

▶**Aircraft Deliveries**—"We are 100% satisfied with the USAF program," Maj. Gen. Kentaro Uemura, civilian head of the air force staff told AVIATION WEEK. "By the end of this year, we should have 150 aircraft from 400 to 500 next year and about 1,300 in five years.

"At that time, the Japan force will approximate the current strength of the Far East Air Force units based in Japan. Provided there are no great changes in aircraft, this force should be adequate to replace American units and take over the defense of Japan."

Gen. Uemura anticipates, however, that new developments may outmode the air force he is building and require USAF to station more advanced air defense units here.

▶**First F-86s**—Half of the 150 aircraft scheduled for delivery by the end of 1954 will be Beech Aircraft Co.'s T-34 Mentor, to be bought with Japanese funds. Some of these may be assembled by Fuji Heavy Industry Co. (formerly Nakajima Aircraft Co.) under its technical tieup with Beech.

The other 75 planes will be North American Aviation's T-28 and T-6 and Lockheed Aircraft Corp.'s T-33, to be supplied under mutual security assistance to Japan.

This country's first Sabre squadron expects to get the all-weather F-86D, but it is not known whether 10 fighters programmed for this year will be Ds or Fs.

▶**Japanese Command**—Japan does not hope to have a full group operating under Japanese command until early 1956. Initially, Japanese squadrons will be incorporated into USAF wings at bases here while their command and staff officers receive on-the-job training alongside American officers in group and wing organizations.

Presumably, similar training will take place in the Japan Air Defense Force, established by Far East Air Force when the peace treaty was enforced in 1952. This training school is under JADF, although it receives much attention from FEAF and the Air Advisory Group.

The Japanese staff is planning to send 200 personnel to the U. S. during the current fiscal year. Half of these men will be pilots.

Asia Air Buildup

(McGraw-Hill World News)

Bangkok—American and other Free World diplomats want U. S. Air Force to base fighter and bomber squadrons in Southeast Asia to shore up flagging morale over the Communist victory in Indo-China.

A real demonstration of U. S. willingness to back up Thailand, Burma and the Malay States with physical strength is necessary to insure their participation in the proposed Southeast Asia Defense Organization.

Putting a group of F-86s or F-84s plus a squadron of B-47s at Don Mu ang airfield here and at a string of bases south on the Malay peninsula to offset the Red threat is considered the easiest and quickest commitment that could be made.

Diplomats fear that U. S. statements, implying support, no longer are adequate to brace local populations. They expected American intervention in Indo-China and, because nothing was done, now wonder if they will be given support against a Communist attack.

Convair Plans 340 Delivery to Lufthansa

Convair expects to deliver the first of four 340s ordered by the West German Airline, Lufthansa, by the end of this month.

However, neither the French nor Italian parliaments has ratified the necessary contractual agreements between members of the European Defense Community, a matter which must be done before the Germans can achieve full air sovereignty and operate their own airline (AVIATION WEEK May 17, p. 16). The U. S. and Britian have approved the agreements.

The Italian parliament has recessed for the summer and the French still show no inclination to bring the matter before their legislature.

The German airline was unable to take delivery on a Convair in January (AVIATION WEEK Feb. 1, p. 15). Convair sold the 340 to Union Carbide & Carbon Corp.

▶**Official Rebirth**—In Cologne, Germany, meanwhile, Lufthansa was reborn officially this month at a board meeting of Luftag, which was set up 18 months ago to develop plans for the reorganization of the airline.

The air carrier hopes to begin operating no later than the end of this year. In addition to the 340s, it has four Lockheed Super Constellations on order.

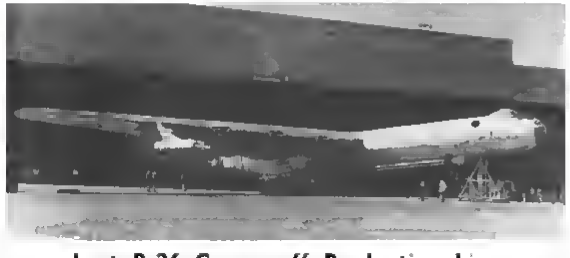
Both Convair and Transocean Air Lines have contracts to train flight personnel for Lufthansa. TALOA will train four flight engineers at its Oakland, Calif., base and expects to receive more engineers later.

Four pilot captains are being trained by Convair at its San Diego plant. Flight crews also are being trained in England and the Middle East. Others are receiving ground and flight simulator training in West Germany.

▶**Routes**—Lufthansa plans to establish at least six routes once its operation is assured. Included will be two trans-Atlantic routes, according to International Civil Aviation Organization, linking West Germany with both North and South America.

The overseas routes will carry more than 85% of the airline's total traffic, ICAO says.

Four trans-European routes are planned to Paris, London, Rome and Cairo.



Last B-36 Comes aff Praductian Line

The last of more than 380 Convair B-36 intercontinental bombers produced for Strategic Air Command is rolled nose-high out of its giant assembly building at Ft. Worth, Tex., to clear its 47-ft. high tail. Delivery of first production B-36 was made in 1947. Delivery of last production B-36 was scheduled to be made to USAF Aug. 14.

Feeder, Freight Lines Get Senate Support

Permanent certification of the three certificated all-freight airlines and the 14 local service carriers is provided in legislation approved by the Senate Interstate and Foreign Commerce Committee.

As passed by the House, the measure provided only for the certification of the feeder lines. But the Senate committee declared that the Flying Tiger Line and Slick Airways (now merged) and Riddle Airlines "have shown substantial growth and have demonstrated the commercial need for their specialized services."

Civil Aeronautics Board's failure to grant them permanent certificates, as in the case of the local service lines, "hampers growth and further development," the committee said.

Sen. Pat McCarran, co-author of the bill, has introduced an amendment eliminating the cargo carriers. The measure was sponsored in the House by Rep. Carl Hinshaw.

Air Transport Assn. has taken no position on the permanent certification of feeder lines, although they are members of ATA. Air Coach Transport Assn. has opposed it, claiming "the non-scheduled operators started before the local service lines in most cases and proved their fitness without certificates or subsidy . . ."

Navy Urges Tinkertoy Production in Avionics

Navy's Bureau of Aeronautics will encourage avionics firms to use "Project Tinkertoy" manufacturing techniques (AVIATION WEEK Oct. 12, 1953, p. 72) by offering development and production contracts for certain items of equipment based on configurations produced by the mechanized manufacturing process.

Behind BuAer's new policy is an effort to "develop sufficient capacity in the electronics industry to produce the large volume of military quality equipment that will be required in the event of global war."

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'Divisions having cognizance over design and/or procurement of electronic equipment shall encourage . . . contractors to produce equipment utilizing mechanized production techniques in all high mobilization requirement equipment, where the use of these techniques will substantially reduce the lead time required for mobilization production schedules."

BuAer plans to form a committee soon to develop further incentives for manufacturers to utilize the "Tinkertoy" process.

The only company now using 'Tinkertoy' techniques for BuAer contract production is the Kaiser Electronics Division of Willys Motors. American Car and Foundry Co. recently established an Electronics Division near Alexandria, Va., using mechanized manufacturing methods (AVIATION WEEK Feb. 1, p. 11).

Aircraft Companies Lose L.A. Tax Appeal

Los Angeles—Local aircraft manufacturers have lost their appeal for elimination of county tax assessments amounting to more than $130 million.

It was the second defeat on the same issue.

Assessments were levied by the Los Angeles County on the basis that defense aircraft and parts are property of the manufacturer before they are turned over to the government.

▶**60 Protests**—More than 60 local defense plants contended in hearings before the county Board of Supervisors that the assessed property belonged to the federal government and therefore was not subject to personal property taxation (AVIATION WEEK Aug. 2, p. 15).

Spokesmen for the armed forces supported the view that when materials and equipment are ordered by the armed forces, the government takes title immediately.

The board, however, turned down the appeals. The board denied protests of the aircraft manufacturers on the same issue last year. That decision still is on appeal before the courts.

▶**Increased Cost**—Paul Berger, manager of the Lockheed Aircraft Corp.'s tax department, protested the assessment this way: "Our Air Force and Navy contracts require that we do everything we can to protect the federal government against local tax increases that can be charged against these contracts."

As an example of the amounts involved in the case of the large airframe manufacturers, Lockheed's payment last year amounted to over $1.1 million, which the firm paid under protest, leaving the way open for later legal action.

This year, the company's assessment totaled some $17 million with an additional $2.6 million for Lockheed Air Service. Tax on these amounts amounted to more than $1.5 million. The company says it again will pay the tax under protest and then seek court relief.

The other companies involved plan to follow a similar course.



Fiat Displays Highspeed Trainers

New Highspeed advanced trainers being built by Italy's Fiat are divided evenly between jet and piston powerplants. From left to right: G-82 (Rolls-Royce Nene), G-80-3B (DH Goblin), G-80-1B (DH Goblin), G-59 (Rolls Royce Merlin), G-49 (Alvis Leonides or P&WA Wasp) and the G-46 (DH Gipsy Queen or Alfa Romeo). The planes recently were demonstrated at Villacoubly Airport, France.

Scheduled Airline Safety

U S scheduled airlines carried 16,616,889 passengers a combined total of 9,605,318,000 passenger miles during the first six months of this year, with only one fatal accident, Air Transport Assn reports.

The accident was a Western Air Lines Convair 240 crash near Newcastle, Wyo, Feb 26 (Aviation Week Mar 8, p 7) on a flight between Los Angeles and Minneapolis. Six passengers and three crewmen were killed

Breakdown of the monthly traffic figures:

PASSENGERS

	Trunks	Local service	Territorial	International	Total
January	2,023,001	140,738	52,644	191,676	2,408 059
February	2,016,224	151,316	49,076	175,168	2,391,784
March	2,256,856	168,480	48,997	231,037	2 705,370
April	2,484,822	195,185	49,751	224,756	2 954,514
May	2,514,264	204,685	50,330	221,894	2,991,173
June	2,647,167	218 533	64 713	235,576	3,165,989
	13 942 334	1,078,957	315,511	1,280 107	16,616,889

PASSENGER MILES

(in thousands)

January	1,175 796	26,919	6,370	240,830	1,449,915
February	1 107 393	28,484	5,831	228,751	1,370,459
March	1,256,754	31,809	5,750	270,803	1 565,116
April	1,334 344	36 747	5,723	279,362	1,656,176
May	1,352,252	38 591	6 073	308,154	1 705 070
June	1,465,988	41,233	8,304	343,057	1,858 582
	7,692,527	203,783	38,051	1,670,957	9,605,318

New Copter Engine Develops High Power

A new, supercharged piston engine for helicopters in the 300-hp class has been developed by Aircooled Motors, Inc, Syracuse, N Y, under U S Navy sponsorship Designated the Franklin D425 2, the engine is said to have the highest specific power output of any engine of the horizontally opposed aircooled type The engine is designed to provide military copters with increased sea level and altitude performance

Displacement is 425 cu in and takeoff power rating is said to be 300 bhp from sea level to 8,200 ft Normal power rating is 285 bhp from sea level to 9,600 ft

It is a development of Franklin's O425 1 engine powering the small Sikorsky S 52 copter, its gear-driven, Rootes-type positive displacement supercharger is the most apparent change The supercharger is isolated from torsional vibrations of the crankshaft system by torsionally flexible quill shafts in the supercharger drive gear train All supercharger drive train gears are mounted in ball bearings for maximum gear alignment

For vertical operation, a power takeoff from a flange integral with the top of the engine crankshaft is used Adaptation to horizontal installation can be accomplished readily, aircooled says A dry sump oil lubrication system is fitted

Significant features of the new power plant

• **Engine cooling** is improved by larger cylinder fins and by a cooling fan using small, high performance, airfoil-section blades

• **Cylinder structure** has been modified to increase fatigue strength of the cylinder dome, barrel section and holddown flange Stellite facing on intake and exhaust valves, hollow stem, sodium-cooled exhaust valve and exhaust valve rotators aids durability

The pistons rings have narrow faced, Keystone-section rings The top compression ring is chrome-faced to minimize cylinder bore wear, control oil consumption and to prevent ring sticking at increased power ratings Solid skirt aluminum alloy, precision die-cast pistons are of cam-ground design and use a cast in Ni Resist insert in the top ring groove position to minimize top ring groove wear and pounding

• **Cast aluminum crankcase** has been redesigned to reduce stress concentrations Shot peening of higher-stressed areas is done Strength and durability is said to be increased by using a forged chromium nick-moybdenum steel at maximum machinable core hardness and full nitriding of all surfaces. Main bearing and connecting rod bearing shells are steel backed, copper lead, precision insert type with a thin lead-tin overlay

• **Ignition system** uses dual magnetos, shielded ignition harness and 18-mm shielded sparkplugs Rubber-cushioned torsional vibration couplings isolate the magnetos from the crankshaft torsional vibration system Magnesium heat treated castings are used for all major housings, oil pan, mounting brackets and accessory drive cover-plates

Accessory drives (AN type) are provided for a 200 amp 28 v generator, fuel pump, electric tach, 28-v starter, vacuum and hydraulic pumps.

Airline Traffic to Climb 238%: PNYA Official

Los Angeles—Fred M Glass, director of aviation for the Port of New York Authority, predicts the number of passenger-miles flown by the nation's air lines will increase 238% in the next 20 or 25 years

"To meet this increased flow of traffic," he says, "terminal facilities must be geared accordingly—either through more airports or greater utilization of present fields."

▶ **1,000-Mi Boost**—Virtually all the increase in passenger travel over 1,000 miles will go to the airlines, Glass forecast in an address before the Chamber of Commerce aviation committee

The airlines also will receive 75% of the passenger traffic increase in the 500 to 2,000 mi category and 50% of that in the 150 to 500-mi class, he predicts

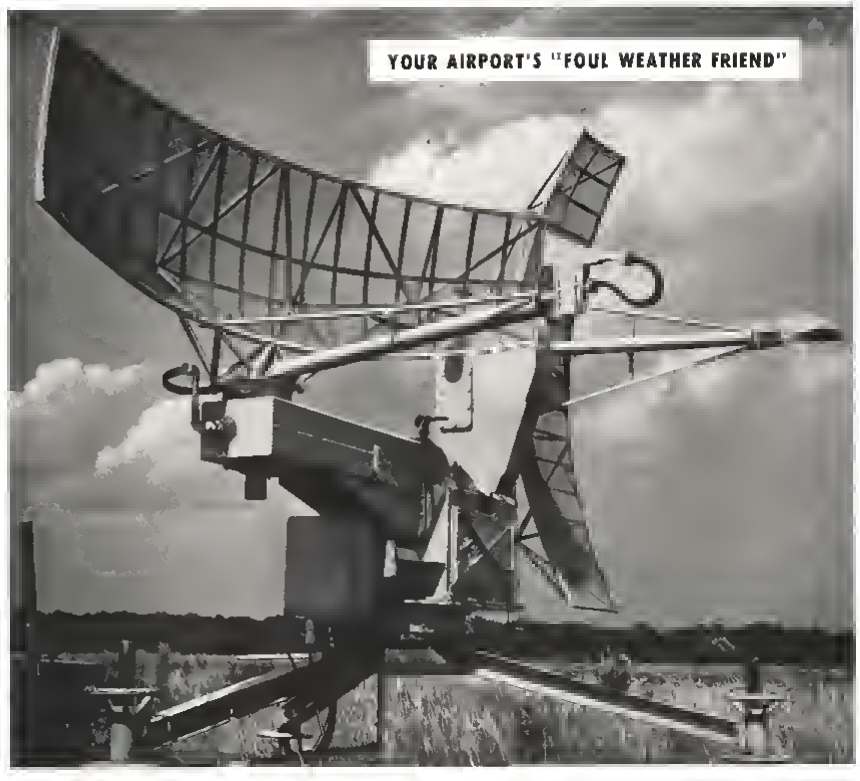
▶ **Noise Control**—He warns that airline, airport authorities and manufacturers must give increased attention to the noise problem

"Actually, the day has come when engine and airframe design must control the noise level," he says "Through improved airport facilities we have gone as far as possible operationally to control the noise factor But if that factor is ignored in the years to come, it will prove to be a definite deterrent to the growth of commercial aviation"

In another prediction before the same group, Jean H DuBuque, executive director of the National Business Aircraft Assn, estimated that between 20,000 and 25,000 multi-engine airplanes will be engaged in business flying in 1965

Lockheed Dividend

Lockheed Aircraft Corp., Burbank, Calif, has declared a 50-cent dividend on capital stock, payable Sept 11 to holders of record Aug 20.



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GRUMMAN TIGER lightweight Navy fighter makes highspeed low altitude pass over runway at company's Peconic River plant.

New Tiger Is Supersonic in Level Flight

- **Grumman F9F-9 represents complete design switch.**
- **New Navy fighter has a very thin wing and tail.**

By David A. Anderton

Peconic River, L. I., N. Y.—The Navy's newest jet fighter prototype—Grumman Aircraft Engineering Corp.'s F9F-9 Tiger—has joined the limited ranks of military airplanes capable of supersonic speeds in level flight. (Also see AVIATION WEEK Aug. 16, p. 381)

Biggest contribution to its barrier-busting performance is the low drag of the airplane, attributed by Grumman engineers to two basic design features: the wasp-waisted fuselage lines for optimum drag characteristics at sonic speeds and the high density of the design layout, which packs a lot of airplane into a small envelope.

The prototype already has been on the high side of Mach 1, powered by the thrust of its Wright J65-W-7 (rated at more than 7,220 lb.), but production airplanes will have the added boost of an afterburner hitched to the tail, and should push even farther into the supersonic realm.



TIGER CLOSEUP shows pressure orifices (tiny black dots), cheek type inlet for Wright J65.

►**Aerodynamics**—The general plan of the Tiger is completely different from any of its ancestors; it forsakes the "Grumman look" which has characterized Navy fighters for two decades.

The fuselage is chunky, its short, pointed nose fairs into one of the "upbill" canopies now nearly standard on fighters. Behind the cockpit, the fuselage stays at almost constant depth until shortly before the tail, when it abruptly rounds off toward the jet exhaust and the fairing around the arresting gear.

Cheek inlets for the J65 are about opposite the pilot's seat; they are mounted off the fuselage by about an inch, to avoid the boundary layer of relatively stagnant air.

From below or above, the indentation of the fuselage lines around the wing root intersection is quite obvious. It is thus nipped in shape that has given rise to the nickname of the "Coke-bottle" fuselage. The peculiar layout is the result of considerable aerodynamic research to produce optimum drag characteristics at some speeds.

►**Surfaces**—The thin sweptback wings are mounted more than halfway down the fuselage. Wing fences are mounted on the upper surface at about one-quarter of the span outboard. Only the small portion of the wing outboard of the tank vents (which can be seen near the wingtips) folds for carrier storage. Folding is manual, instead of powered, and should require little maintenance.

Lateral control system is based on that of the earlier F9F models: roll control appears to come from spoilers set near the trailing edge of the wing. Small tip ailerons are used presumably for feel. Flaps extend from the fuselage intersection out to the wing fold line.

The horizontal tail is extremely thin and mounted low on the fuselage to counteract the tendency of sweptwing airplanes to pitch up at high Mach numbers. The entire tail moves for control during the normal flight regimes, the elevators come into play only when flaps are lowered.

Vertical tail is characterized by a very large taper ratio and a partial span rudder. The tip is a glass-plastic housing for an antenna.

Speed brakes are mounted on the fuselage belly just behind the wheel wells. They are two large trapezoidal surfaces which deflect through almost 90 deg. In the early flights, there has been some buffeting, traceable to their solidity, it is understood that the brakes will be perforated to reduce this tendency.

Main landing gear is similar in layout, but not in detail, to the original retractable gear pioneered by Grumman in 1931 on the XFF-1. Nose gear mounts dual wheels and retracts aft. The main wheels retract forward into the fuselage wells.



TAKING OFF after a short run with its "droop-snoot" wing leading edges lowered, sweptwing F9F-9 begins to retract wheels.



THIN HORIZONTAL TAIL is mounted low. Carrier arrestor hooked is faired under tailpipe.

►**Instrumentation**—The all white prototype is polka-dotted with unpainted circles surrounding static pressure orifices. There are more than 250 of these pressure-distribution points on the airplane. The entire left side of the fuselage and both upper and lower surfaces of the left wing and stabilizer have been instrumented for determination of pressure distribution in flight.

The small blade antenna projecting below the fuselage between main and nose gear is part of the flight test instrumentation, as is the long pitot-yawmeter boom projecting from the nose. These will not be found on production airplanes.

"We've got about as much flight-test instrumentation in here as any of the research jobs out at Edwards (Air Force Flight Test Center)," said one Grumman engineer. "It's packed with photopanels, flight recorders and telemetering gear."

►**Structure**—The Tiger is, judging by the comments, built like other Grum-

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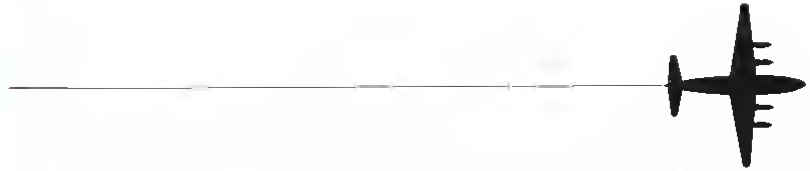
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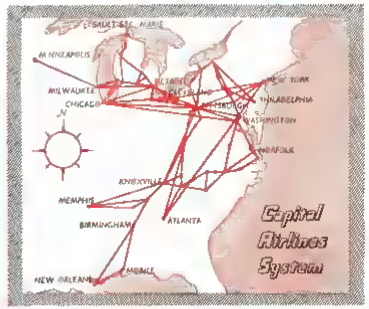
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man airplanes rugged and conventional.

"Production breakdown for this airplane is as easy as it has been in the past," says Joseph Gavin, F9F-9 project engineer. "We wanted to keep it simple and about like the rest of the airplanes we've built."

"There's nothing really exotic in the structure," added Larry Mead, assistant project engineer and former structural designer. "There are some heavy milled skins, but everybody's using them."

The entire upper wing skin is machined from a single chunk of aluminum alloy. This was done for simplicity in assembly. This general philosophy governed the entire Tiger design, the prototype flew less than 15 months after the Navy's go-ahead in the form of a letter of intent.

▶**Flight Demonstration**—In a rare aeronautical event which hadn't been done since the introduction of the Grumman F9F-2 in 1947, project pilot H. C. (Corky) Meyer demonstrated the Tiger before a group of Navy officers, Grumman officials, journalists and cameramen.

It was the fourth flight for the Tiger; first flight was July 30 in the morning, and the second was made later the same day.

After a short takeoff and moderate climb, Meyer brought the plane in low for two upwind passes in succession. These were a little slower than expected but Corky made up for it on the third pass downwind. It was straight, low and fast; it was also amazingly quiet for a highspeed run, perhaps because there was no local shocking in the flow around the plane.

After the third pass, Meyer extended the landing gear and came in for a short landing.

Meyer commented after the flight that the plane had to be held back for the demonstration. (Presumably the Tiger is operating under a temporary speed restriction at low altitudes; this is standard practice with new prototypes.)

He also added that the plane had been supersonic, and that it "gets there with no effort at all."

▶**Future Plans**—Grumman is in production on the new fighter, supplementing its full-rate output of the F9F-8 Cougar, the S2F-1 anti-submarine plane and the SA-16 Albatross. Current contracts from Navy's Bureau of Aeronautics total $40 million for the development and production of the F9F-9 Tiger.

Grumman personnel, publicly enthusiastic about the new airplane, carry that enthusiasm over into private expressions of delight both with the plane's design and with the strengthened position of their company.

Industry observers have wondered for a long time when Grumman was going to pull out of the design doldrums into which it slipped after the end of World War II. The F9F-9 Tiger is an indication that the time is now.

New Inventions

Government Offers Patents for License

New patents issued recently on inventions assigned to the U. S. in the field of aircraft and parts have been reported to AVIATION WEEK by the Government Patents Board.

These inventions are available for license, ordinarily on a non-exclusive royalty-free basis, on application to the agency indicated in the abstract. Printed copies of letters patent may be obtained from the Commissioner of Patents, Washington 25, D. C., at 25 cents a copy, payable by check or money order (stamps not accepted). Specify patent number and title when ordering.

▶**SUPERSONIC WINDTUNNEL APPARATUS.** Patent No. 2,677,274, issued May 4, 1954.

A supersonic windtunnel comprises a special support for mounting the model in the windstream consisting of an arm which extends directly behind and downstream of the model so that it is shielded thereby. As far rearward of the model as is mechanically feasible, the supporting arm enters a windshield through a small aperture which permits free motion of the arm. Behind the windshield the arm is connected to a floating beam of a force measuring device so that the forces acting on the model can be measured. Inventor: Allen E. Puckett. Administered by the Office of the Judge Advocate General, Department of the Army, Washington 25, D. C.

▶**HAND-HELD LOW-ALTITUDE BOMBSIGHT.** Patent No. 2,677,301, issued May 4, 1954.

A portable bombsight, which can be held in the hand for low-altitude bombing of targets under water, comprises a mechanical computer, separate means for inserting in the computer the target course, the ground speed and the altitude of the airplane, means for correlating the data thus inserted and a bomb release indicator responsive to the correlation of these factors. The device includes a target submergence compensator having a timer, a speed control responsive to altitude and means to alter the correlating means in accordance with the rate of travel of the target under water. Inventors: Richard W. Pitman and Frank W. Schlesinger. Administered by the Patent Counsel, Department of the Navy, Washington 25, D. C.

▶**GROUND TRACK MARKER.** Patent No. 2,678,441, issued May 11, 1954.

An airborne radar system comprises a rotating antenna and an indicator for presenting echoes received by the antenna as a function of the angular position of the antenna. The indicator comprises an electro-mechanical device synchronized with the rotation of the antenna for producing a sinusoidal voltage output, means for phasing the output to have a node in time coincidence with the antenna pointing in the direction of the aircraft course and a marker coupled to the device for producing an indication of the maximum slope of the voltage output and thus the location of the target. Inventor: Richard N. Close. Administered by the Office of the Judge Advocate General, Department of the Army, Washington 25, D. C.

▶**SUPERSONIC WIND TUNNEL.** Patent No. 2,678,560, issued May 18, 1954.

A supersonic windtunnel comprises an effuser, a test section and a recovery diffuser. The effuser raises a portion of high-pressure air to supersonic velocity. The tunnel includes a bypass for the high-pressure air and means in series with the bypass for receiving the bypassed air and for reducing the pressure at the exit of the diffuser to extend the Mach number of the tunnel. Inventor: Everard A. Bonney. Administered by the Patent Counsel, Department of the Navy, Washington 25, D. C.

NYU Prepares Text On Aircraft Design

New York University's Engineering Research Division is taking the first steps to complete a long-needed project: compilation of an aircraft structures encyclopedia.

Sponsored by the National Advisory Committee for Aeronautics, a group of NYU engineers will compile design and analytical data on the many aspects of wing and fuselage structural components, with special emphasis on minimum-weight structures. New material will be incorporated continually as it becomes available.

Spokesmen for the aircraft industry say that such a summary is badly needed. They point out that a great number of relatively inexperienced engineers are designing airplanes, and that the turnover rate among aeronautical engineers is about 30% per year. Such summaries, they say, would enable these engineers to locate design and test data more easily and quickly than is now possible.

The new project will be carried out under the direction of Dr. George Gerard, assistant director of the research division.

THRUST & DRAG

Once there was a small Town living in the shadow of a Menace. The woods nearby were full of Dragons, not the walking kind, but winged, fire-breathing monsters. Everyone in the Town knew the Dragons were there, because the beasts made all sorts of noises, and occasionally one of them would venture forth and gobble up some unfortunate living near the woods.

Soon the King heard about this, and he sent a Messenger to the Town, offering help. "I will send some armed Knights," the King said. "They will defend you against the Dragons."

But the Town was noted for its quiet gardens and green lawns, and the thought of the stillness disturbed by the clang of armor was repugnant to some of the townspeople. "The Knights will be noisy, and drink mead all night long," some said. "They will have to live somewhere, and who wants a barracks in this town?" said others. "A few would be bad enough, but the presence of a whole Company will surely make our beautiful property worthless," said still others.

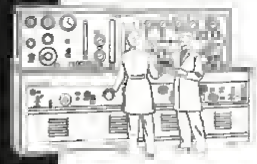
So the Messenger went back to the King and told him of the attitude of the Town. The King was sorry, but he respected the will of the people as was the Law of the Land.

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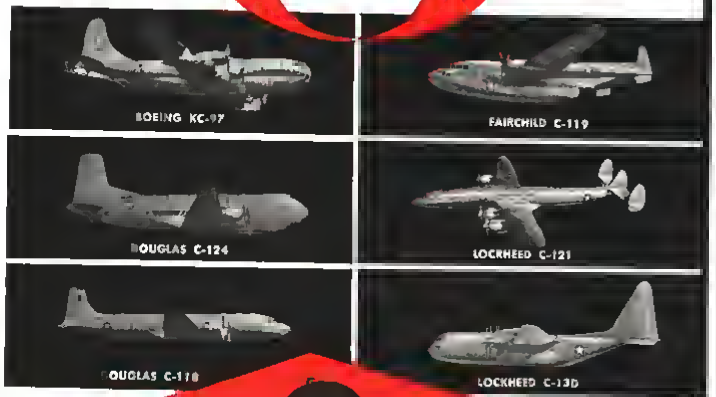
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One night, all the Dragons got together and attacked the Town. They made much more noise destroying the Town than the Knights would have made defending it, and when morning came and the last Dragon headed back to the woods, the property in the Town was indeed worthless.

But nobody in the Town protested. They were all dead. Moral: Did you sign a petition protesting against the location of a Nike site?

* * *

Comment of an amazed engineer viewing a mockup of an unannounced airplane: "Pretty soon the wing is going to be reduced to nothing more than a symbol painted on the side of the fuselage!"

* * *

Quote from an aircraft company's newspaper: "Recent newspaper and magazine articles have made us very much aware of the imprint made upon the entire universe by———aircraft."

Whaddaya hear from Saturn?

* * *

Inspirational mottos on office walls leave me cold, better we should cover the walls with some quiet abstract art or a cool blue photomural of the sea. But I'll make an exception to a pair of signs in the Office of Information Services at the Air Materiel Command, Wright-Patterson AFB.

They say simply "SMILE" and "THINK."



Thrust Recorder

McDonnell F2H-1 Banshee sits on Bristol Engineering Corp. portable stand that can measure thrusts up to 20,000 lb. ±100 lb. The hydraulic-electric measuring equipment incorporated in the stand is supplied by Automatic Temperature Control Co. and A. J. Emery. Model C stand, illustrated, is one of a series developed by Bristol. Permanent types can be mounted in concrete pit flush with the runway or concrete apron surface near a hangar. Stands for thrusts from a few thousand to 100,000 lb. have been developed. Installations have been made at Naval bases and large aircraft plants for calibrating jet engines and checking their performance. Bristol's address: Bristol, Pa.

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NEW PRODUCTION PLANT AT DOWNSVIEW AIRPORT, ONTARIO, turns out de Havilland Canada s Beaver and Otter for wide group of users Next year, plant is expected to produce the Grumman S2F anti-sub plane under license. Facility was built with DHC funds

New De Havilland Canada Plant Rolling

Forced to vacate its plant because of RCAF expansion, DHC built a 600,000-sq.ft. facility to make Beavers, Otters and Grumman S2Fs.

By Irving Stone

Toronto—In March this year, de Havilland Aircraft of Canada, Ltd., moved into its new 600,000 sq. ft manufacturing plant at Downsview Airport The plant now employs about 2,000, about three fifths of them in direct labor Engineers and draftsmen number about 100

The Aircraft Division s new facility located on a 96-acre site, was built with DHC funds to replace the company's former Downsview plant, which was taken over by the government The old site was in the midst of the Royal Canadian Air Force expansion area slated to become a Canadian "Wright Field"

Before the new plant layout was finalized, DHC's production experts visited the facilities of many U. S airframe builders for a close look at their manufacturing schemes

▶**Many Projects**—Production lines in the new plant are pushing out these DHC aircraft

▪ **DHC2 Beaver** The company is building this plane as a haison-cargo-transport type (L 20) for the USAF and the U. S. Army It is powered by a 450 hp P&WA R985 engine, a government-furnished war surplus powerplant overhauled by Pratt & Whitney Aircraft or an approved contractor

The Beaver also is being produced for the Chilean Air Force, Colombian Air Force, and for export to more than 30 countries.

DHC has built more than 650 of the planes—a seven place transport type with a top speed of 163 mph , maximum gross of 5,100 lb , empty weight of 2,960 lb , 48-ft span and 30-ft length.

At a Downsview demonstration, this writer witnessed the Beaver take off in about 300 ft in a light wind, full load. Guaranteed takeoff is reported at about 558 ft , zero wind, full load

▪ **DHC3 Otter** This is being built for the Royal Canadian Air Force and for several countries in the NATO group

More than 50 have been turned out to date The Otter is an 11-15 place transport with a maximum speed of 160 mph , 7,600 lb gross and 4,345 lb empty weight, 58-ft span and an approximate 42-ft length

Powerplant is the 600-hp P&WA R1340, an overhauled model with a geared drive This engine also was used in the North American AT-6 and the Noorduyn Norseman, but as a direct drive unit

In a demonstration at Downsview, the Otter took off in about 125 ft. in a light wind, the plane loaded with about 300 lb. ballast Guarantee is 600 ft with full load, zero wind.

▪ **Overhaul** In its new plant, DHC also is overhauling the Comet 1A, North Stars, Vampires and Otters for the Royal Canadian Air Force.

▪ **Grumman S2F.** Another project the company expects to tackle by early next summer is the production, under license, of the Grumman S2F anti-submarine warfare plane for the Royal Canadian Navy. DHC personnel are now in liaison with Grumman engineers The plane will be built in what is now being used as the overhaul bay

▶**Agricultural Kits**—DHC has manufactured an agricultural kit for adaption to the Beaver for liquid (insecticide or fungicide) spray jobs. The U.S. Army has 22 of these kits for pest control work with its Beavers

Another kit, which DHC placed on the market last fall, is a combination unit—essentially a hopper for fertilizer, seed or any pelleted material, capable of adaption for liquid spraying

For aerial top-dressing and seed spreading, the 35-cu ft hopper carries up to 1,850 lb of chemical fertilizer or seed, gravity discharged through a chute Density of the coverage is governed by the chute door aperture selected by pilot Rapid loading is obtained through a roof hatch. DHC reports that the average time between landing an empty Beaver and fully loaded takeoff is 65 sec. At this rate, 20 roundtrips (with use of loader) can be made in one hour and 165 acres dressed at a coverage of 225 lb per acre.

▶**Conversion for Spraying**—For liquid spraying, a sump fitted with an emergency dump door replaces the chute unit The hopper is fitted with a neoprene bag secured to fuselage roof hatch by a square, dished panel. Lateral booms extend from the sump

Outboard ends of the booms are fitted with rotors embodying a wind-driven fan turning a wire brush for dispersal of the fluid Valve adjustment permits variation of discharge rate from 1 to 50 gpm Selection of droplet size is obtained with a variety of brush sizes and types, and fans of various pitches and capacity.

An alternate spraying arrangement incorporates span-length spray booms A belly-mounted wind-driven pump ahead of the sump feeds fluid under pressure to a series of nozzles on the booms, with droplet size varied according to nozzle size.

▶**Other Adaptions**—As a supply dropper, the Beaver is fitted with four external racks beneath the wings Each rack will carry 250 lb Another rack on the underside of the fuselage will carry 800 lb A button on the control wheel permits dropping of any or all of the five loads The Beaver also is designed to operate on floats or skis

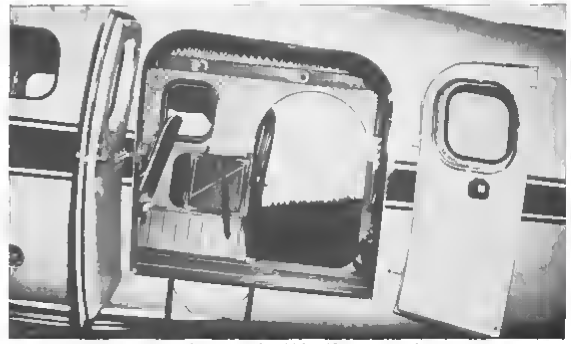
▶**Overhaul Facility**—Another big activity at DHC is its Engine Division at



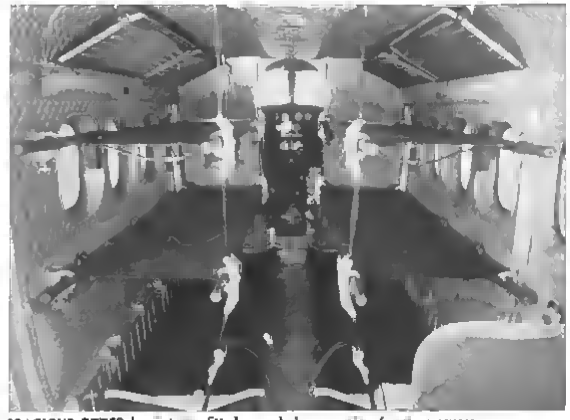
BEAVER LINE in long assembly bay Plane is being built for USAF and U. S Army as L-20 With agricultural kit, craft is adaptable for fertilizing, seeding, spraying



OTTER is shown with retractable ski gear. Beaver also may be fitted with skis



PORT LOADING DOOR on Otter provides 45 by 46-in passage for moving cargo



SPACIOUS OTTER has interior fitted as ambulance version for six evacuees.



Quicker installation and easier maintenance . . important plus-features for airborne electronics equipment are a reality at Air Arm. The basic Air Arm approach to *all* electronic problems, combined with inherent ingenuity and capability, has led to concepts such as pallet packaging, encapsulated and functional circuitry, built-in test points . . . to mention just a few

Applying these concepts to all Air Arm systems gives outstanding features . . .

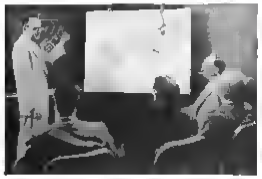
- 100% accessibility
- compatibility with aerodynamic design
- weight and space reduction
- self-contained shock isolation
- simplified airframe design and construction

MAGAMPS, potted units and other proven developments for weight and size reduction are a basic part of the new packaging concepts. Electronic circuits are physically combined and integrated into compact subassemblies—each of which has a single major function. Thus, over-all packages are made up of functional units of complete systems.

This "package-engineering" results from intense Air Arm development and close Air Arm association with the special problems of airframe design and operational requirements. Such achievements in electronic-mechanical design are typical of Air Arm's efforts to bring simplicity and increased reliability into airborne systems, thus bringing tomorrow's aircraft—One Step Closer. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-91019





MAGAMPS typify the "package-engineering" which Air Arm applies to airborne systems. Simple and reliable as iron and copper, they are a rugged replacement for vacuum tubes. Wherever such packaging is used, maintenance is reduced, circuitry is simplified and systems are far more dependable.

The most advanced state-of-the-art is always brought to bear in Westinghouse design, evaluation and improvement of airborne systems. For example, human engineering studies help technicians perform tasks quickly, simply and surely—thus building the greatest amount of dependability into the system.

Jet Propulsion • Airborne Electronics • Aircraft Electrical Systems and Motors • Wind Tunnels to Plastics

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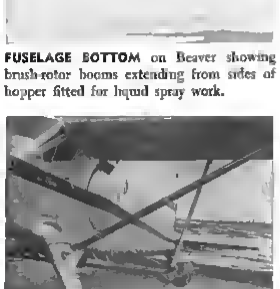
BEAVER (L-20), used by USAF as liaison-cargo-transport plane, also is intended for other missions, including supply dropping, wire laying, and aerial evacuation



FUSELAGE BOTTOM on Beaver showing brush-rotor booms extending from sides of hopper fitted for liquid spray work.



CHUTE INSTALLATION on bottom of Beaver's hopper is used for dropping pelleted material in agricultural work



ROTOR comprised of wind-driven fan and wire brush fitted at end of pipe boom is used to disperse liquid in spray form

Downsview Airport, housed in a government-owned plant covering 86,240 sq ft. DHC went into operation there at the beginning of this year, taking over from the Canadian General Electric Co. when the Department of Defense Production decided it would overhaul RCAF Avro Orenda jet engines there, as well as GE J47s.

different kinds of aircraft parts required on the production lines.

Originally thought of in 1945, the idea will save Lockheed $250,000 in its first full year of operation, the company says. A 25% reduction in floor service and stock control personnel and 60,000 sq. ft. saving in floor space have followed introduction of the system.

Acting as the supermarket's "cash register" in the self-service bins are "shortage forecasts" made out weekly for each bin. These serve as an inventory and, combined with "parts inventory control lists," make it unnecessary to maintain elaborate card-filing systems usually required in stock control. Parts go directly from the spot in the plant where manufacture is completed to the point where they will be installed in the plane.

Self-Service Speeds Parts Handling

Successful completion of a year's trial of a parts "supermarket" at Lockheed's Marietta Division in its B-47 assembly area has led to a decision to extend the idea to subassembly departments and the C-130A production program. Self-service bins are used to issue 25,000

PRODUCTION BRIEFING

▶**Pastushin Aviation Corp., Los Angeles**, has constructed a 20,000-sq. ft. addition at 11221 Hindy Ave. for increased production of plane components. Firm has three additional facilities in Los Angeles.

▶**"Fishing" wires** through a just-big enough tube of protective vinyl plastic, previously a headache at **Glenn L. Martin Co., Baltimore**, has been solved by stretching the tube between two hollow mandrels, and using air pressure to blow a small metal "mouse" through the tube. A cord attached to the mouse is fastened to a crank. The other end of the cord is fixed to the wires, air pressure continuously applied to spread the tube, and the wiring cranked through.

▶**Hanley Patents, Inc.**, 580 Fifth Ave., New York, has been formed to introduce in U.S. and Canadian markets quick release equipment, harness and gear which its founder has supplied to the RAF and British aviation firms. The company is in production on these items in New Hampshire and Ohio.

▶**Advance Gear & Machine Corp.**, Los Angeles, has acquired two Reishauer Model ZA gear grinders which will materially boost the firm's production capability.

▶**An Associates, Inc.**, Teterboro, N. J., is planning to produce special shoulder harnesses for lightplane pilots.

▶**Walter R. Falck Co.**, Philadelphia, has been named by Sealectric Division of Williams Manufacturing Co., Chicago, as sales representatives in eastern Pennsylvania and southern New Jersey for relays, circuit breakers and hermetically sealed electric controls.

Navy Contracts

Contracts recently announced by Navy's Aviation Supply Office, 700 Robbins Ave., Philadelphia 11, are:

A. C. Spark Plug div., General Motors Corp., Flint 2, Mich.: spark plugs for various aircraft engines, $417,000.

Adel div., General Metals Corp., 10777 Van Owen St., Burbank, Calif.: hydraulic valve, $57,004.

Aeroten Corp., div. of The Thermix Corp., Condy Ave. & Pemberwick Rd., Greenwich, Conn.: switch assy., 320 ea., $28,016.

Albert & J. M. Anderson Mfg. Co., 865 A St., Boston 10, Mass.: cable assy., $27,037.

William Armstrong-Smith Co., 109 E. Forest Ave., E. Point, Ga.: paint, 142,000 gal., $188,918.

B. L. Aud Co., E. 9th Ave. and 5th St., Columbus 1, Ohio: reel, aircraft mooring, 31,021 ea., $112,402.

B. G. Corp., 130 W. 42nd St., New York 18, N. Y.: spark plugs, 80,478 ea., $287,982.

Bertea Products, Pasadena, Calif.: valve, hydraulic, 440 ea., $31,109.

Liquidmeter Corp., 41-03 30th St., Long Island City, N. Y.: box & densitometer assy., $39,906.

McDonnell Aircraft Corp., St. Louis 9, Mo.: vacuplex, 1 ea., $49,427.

Magnetic Amplifiers Inc., 932 Tinton Ave., New York 59, N. Y.: voltage regulator, 131 ea., $57,805.

Publicker Industries, Inc., 1429 Walnut St., Philadelphia 9, Pa.: alcohol, denatured ethyl, $42,543.

George Scott Inc., 2200 E. Westmoreland St., Philadelphia, Pa.: grease-cleaning compound, $32,738; $41,960.

M. Steinthal Co., Inc., 632 Fourth Ave., New York 9, N. Y.: parachute parts, 200 ea., $33,227.

Vickers, Inc., 1400 Oakman Blvd., Detroit, Mich.: pump assys. and spare parts, $121,272.

Weston Hydraulics Ltd., N. Hollywood, Calif.: hydraulic valve, $78,905.

USAF Contracts

Following is a list of recent USAF contracts announced by Air Materiel Command:

General Electric Co., One River Road, Schenectady, N. Y.: lube-electron transmitting triode, general purpose glass, 64,000 ea., tube-electron triode, general purpose glass envelope, 50,000 ea., $380,650.

Sprague Engineering & Sale Corp., 1144 W. 130th St., Gardena, Calif.: testers, pressurized cabin leakage, aircraft portable gasoline engine driven, 10 ea.; maintenance spare parts, maintenance data, engineering data, $50,540.

Sylvania Electric Products Inc., Electronics Div., 100 Sylvan Rd., Woburn, Mass.: klystron, tube type 8828, 1,280 ea., $49,020.

Triumph Manufacturing Co., 910 West Van Buren St., Chicago, Ill.: test set, LA12 and A10 aerial camera magazine, servicing in a/w exhibit, 210 ea.; maintenance spare parts, maintenance data, engineering data, $122,226.

AC Spark Plug Div., General Motors Corp., Milwaukee, Wis.: calibrater, 7 ea.; setting fixture, 4 ea.; calibrating fixture, 1 ea., $38,208.

Octagon Process, Inc., 15 Bank Street, Staten Island 1, N. Y.: compound-cleaning, 264,000 gal., $141,008.

Columbia Aircraft Services, Bloomsburg Municipal Airport, Bloomsburg, Pa.: overhaul and/or repair of generator sets, 22 ea., $28,275.

Irving Air Chute Co., Inc., 1915 Versailles Rd., Lexington, Ky.: parachute assembly, personnel troop type T-10, 134 ea., $38,270.

M. Steinthal & Co., Inc., 632 Fourth Ave., New York 3, N. Y.: harness, personnel parachute troop back type, 7,710 ea., $102,600.

Swillik Parachute Co., Inc., 1209 East State St., Trenton, N. J.: cushion assembly, parachute seat, latex rubber filled, 2,893 ea., $37,295.

Yale & Towne Mfg. Co., 230 Henry St., Stamford, Conn.: overhaul and/or repair of pump, fuel power operated, 321 ea., $50,330.

Link Aviation Inc., Binghamton, N. Y., follow-on spares, $25,051.

Felton Trenser Co., Inc., 212 Central Ave., Atlanta, Georgia, Items 1 thru 3—suit—flying, man's, coverall, style cotton twill, type, $3,000 ea., $290,320.

Henry Germeet Co., 180 Garnett St., S.W., Atlanta, Georgia: Item 1—size 20, 19,140 ea., Item 2—size 32, 30,895 ea., Item 3—size 34, 85,032 ea., $830,540.

Hodson Garment Co. Inc., 500 Broadway, New York, N. Y.: Item 1—suit—flying, man's coverall, style cotton twill, various sizes, 15,742 ea.; liner, trousers, flying, wool serge, type B, $146,243.

Joanna Woolen Mills Co., 22nd and Jefferson, Chicago 16, Ill.: Item 1—cloth, lined, starched linen, glazed finish, oil impregnated 12" wd., 100 ft. long, 3,000 rl., $25,200.

Southern Athletic Co Inc., 111 Fort Sanders Ave., Knoxville, Tenn.: Item 1—trousers, flying, man's, nylon twill, type D-1B, 78,200 ea., $1,430,806.

Wayne Works Inc., 1800-1700 N. "F" St., Richmond, Indiana, Item 1—maintenance platform, aircraft, adj. 8 to 10 ft., type E-1, in a/w spec., Item 1A—spare parts for Item 1, Item 1B—maintenance data, 1,801 ea., $724,102.

Air Products, Inc., Emmaus, Pa.: cylinder, wire copper valve, 84 ea., 894 lots, 28 ea., $35,400.

Emerson Elec. Mfg. Co., St. Louis, Mo., turret assy., 3 ea.; booster assy., 8 ea., $97,907.

Federal Motor Truck Div., Detroit, Mich.: bar-rack frt. bumper, 45 ea.; glass-safety cab door, 1,400 ea., windshield, 183 ea., $152,075.

Kearney & Trecker Corp., Milwaukee 14, Wis.: machine, 9 ea., $140,845.

Lempco Products Inc., Bedford, Ohio: grinder, 6 ea., $99,420.

Lycoming Div., Avco Mfg. Corp., Williamsport, Pa.: honing assy., 226 ea.; crank case, 204 ea.; sump assy., 374 ea., $164,011.

Glenn L. Martin Co., Baltimore 3, Md.: engine, 84 ea., $27,804; Kits, 125 ea., $44,806.

Motor Truck Sales Co., San Antonio, Tex.: rod, 340 ea.; shaft assy., 232 ea., $34,008.

Trailmobile Inc., Cincinnati, Ohio: suspension assy., trailer, 27 ea.; gear assy., 118 ea.; seal, 218 ea., $80,193.

Roswell Corp., 600 Pacific St., Brooklyn, N. Y.: handset, headset, 8,870 ea., $181,280.

Technical Material Corp., 700 Fenimore Rd., Mamaroneck, N. Y.: frequency shift exciter, 70 ea., variable frequency oscillator, 75 ea., antenna tuning unit, 75 ea., $318,210.

Aluminum Co. of America, 1200 Ring Bldg., Washington, D. C., alum. alloy-sheet, 172,029 lb., $138,263.

North American Aviation Inc., International Airport, Los Angeles, Calif.: puller, 10 ea.; kit, 6 ea.; wrench, 6 ea., $22,977.

Olympic Screw & Rivet Corp., 11466 South Downey Ave., Downey, Calif.: rivet, 4,300.

Republic Aviation, Inc., Farmingdale, L. I., N. Y.: indicator, 119 ea., wrench, 88 ea., $40,204.

Zenith Optical Div., Felen Industries Inc., Huntington, W. Va.: sight-bore, 78 ea., $87,042.

Continental Aviation & Engr. Corp., 1900 Algonquin Ave., Detroit: turbojet engines, 5 ea., $1,004,817.

Engineering and Research Corp., Riverdale, Md.: flight simulators, 2 ea., $865,742.

General Electric Co. X-Ray Dept., 4855 Electric Ave., Milwaukee: camera, K-37, lens cone and engr. data, 1 ea., $91,500.

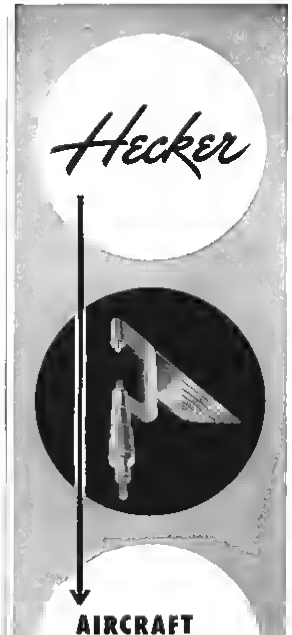
Graphic Films Corp., 1618 N. Las Palmas, Hollywood, Calif.: production of motion picture, 1 ea., $28,092.

Grimes Manufacturing Co., Urbana, Ohio: light assy., $25,477.

Harney Machine Co., Inc., Torrance, Calif.: facilities for production of forgings and extrusions, $4,500,000.

Hughes Tool Co., Hughes Aircraft Corp., Culver City, Calif.: overhaul and repair fire control systems, $100,081.

McCooley Industrial Corp., 1040 Howell Ave., Dayton 7, Ohio: propellers, 735 ea., $132,300.



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1. MASS PRODUCTION of millions of low-cost, high-frequency junction transistors is object of General Electric program to mechanize production of tiny germanium bars (lower left), sliced from ingot (upper left) and their assembly into transistor (right).

GE Aims to Boost Transistor Output



2 GERMANIUM INGOT is "rate-grown" with desired transistor properties by slowly rotating and withdrawing seed crystal from melt whose temperature is closely held.



3 MECHANIZATION of such difficult operations as finding the best spot to attach the base lead, and connecting emitter and collector, are part of GE program.

General Electric is tooling up to mass produce low-cost junction transistors in both triode and tetrode types, which reportedly have usable gains up to 15 mc and 150 mc, respectively. Also of interest to avionic equipment designers, the new N-P-N germanium transistors have been successfully operated at temperatures above 85C for many hundreds of hours, company says.

► **Mechanization**—GE says it has successfully mechanized the "rate-grown" process used to produce germanium ingots with the required semi-conductor properties. In this process, a small seed crystal is inserted into a germanium melt (containing infinitesimal amounts of gallium and antimony) in a resistance furnace whose temperature is carefully controlled. The seed is then slowly revolved and withdrawn at a variable rate, automatically controlled to grow a mono-crystalline ingot with the desired properties. The process requires about two hours per ingot.

► **Sliced, Diced & Mounted**—The ingot is then sliced and diced into several thousand bars, 0.02 in. square by 0.1 in. long, to which the emitter, collector, and base leads must be connected. Previously this has been a manual operation performed under a 40-power microscope. Locating the optimum point on the very thin P-type barrier to which the base lead (half the thickness of a human hair) is attached is particularly critical.

GE now is designing machines which will automatically locate the correct base lead position and attach it, as well as the collector and emitter leads. After this step, the transistor element is mounted on a base, then hermetically sealed.

► **Competitive With Tubes**—Company spokesman says that transistor prices should become competitive with tubes when large-scale production is reached. GE speaks of mass production in 1955, production "in the millions" within two years. Company currently is producing several hundred units per week on a pilot line.

Avionics Expansions

Recently announced corporate moves, expansions, and changes in the avionics industry include the following:

• American Phenolic Corp., large U. S. connector manufacturer, has announced the formation of a Canadian affiliate, Amphenol Canada Ltd., with plant and offices located at 300 Campbell Ave., Toronto, Ontario. The new northern affiliate has 30,000 sq. ft. of plant space.

• Wm. R. Whittaker Co., Ltd., has purchased the Schwien Engineering Co., Van Nuys, Calif., manufacturer of gyros, to expand Whittaker's activities in the avionics field. F. B. Meyer is president of the new Schwien division; Nevin Schwien has been elected executive vice-president.

• Bruno-New York Industries has purchased the assets of Computer Corp. of America, maker of IDA analog computers and instruments, naming the new division Computer Company of America.

• New RTCA members, elected during a recent business session of the Radio Technical Commission for Aeronautics include: Stanford Research Institute; Applied Electro Mechanics, Inc., Washington, D. C., and Phelps, Inc., of Baltimore.

Submin Photocell Has High Output

A low-cost subminiature photocell with sufficient output to actuate a relay directly without intermediate amplification, is one of several recently announced avionic components.

The new cadmium sulphide photocell, measuring ¼ in. dia. x ¼ in. long, delivers from 2 to 5 ma. when exposed to 50 to 100 ft. candles of light intensity with 100 volts applied across the cell and load. Cells, which are sensitive to visible light, ultraviolet, X-rays and nuclear radiation, reportedly have a response time of 0.01 sec. at 50 ft. candles. Bulletin PC-10 gives more details. Standard Piezo Co., Carlisle, Pa.

Other new components:

• **Time delay relay** uses built-in resistor-capacitor circuit to provide time delays of 15 to 500 milliseconds. Hermetically sealed unit weighs 6½ oz., is designed for operation in voltage range of 18 to 30 v. d.c. Electronic Specialty Co., 3456 Glendale Blvd., Los Angeles 39, Calif.

• **Precision resistor**, encapsulated grouped type consisting of two to six individual wire-wound (non-inductive) resistors, comes in lengths up to 3 in., in resistances up to 1.95 megohms, ¼, ½, or 1 watt sizes rated for 125C ambient. Tolerances as close as 0.1% can be obtained. Ohmite Manufacturing Co., 3664 Howard St., Skokie, Ill.

• **Thyratron tube**, Type ELC6J/F, is grid-controlled rectifier designed for panel mounting. Maximum average anode current is 6.4 amp.; peak current is 77 amp., peak inverse voltage is 1,250, peak forward voltage is 1,000. Average tube drop is 9 v., grid firing voltage is −4.6 ±1.6 v. Electrons, Inc., 127 Sussex Ave., Newark 3, N. J.

• **Miniature solenoids** are available in either enclosed (No. 20288) or unenclosed (No. 20287) models, weighing 0.14 and 0.12 lb., respectively. Units measure ¾ in. in dia. and approximately 1½ in. long. Typical performance is a 25 oz. pull over a ¾-in. stroke when operated 24 v. d.c., 13 amp. for 5 sec. maximum on time in a 20C ambient. Bulletin PR-S2 gives more details. Cannon Electric Co., 418 W. Avenue 33, Los Angeles 31, Calif.

FILTER CENTER

► **New Transistors**—New tetrode (four element) grown junction n-p-n germanium transistor, suitable for use in automatic gain control circuits, and a new germanium phototransistor have been announced by Texas Instruments Inc. New Type 700 tetrode has an alpha of 0.95 or higher, can provide up to 20 db attenuation of output signal with less than 100 microamps applied to second base lead, company says. New photo transistor, identified as Type 800, is a n-p-n grown junction type. Company address 6000 Lemmon Ave., Dallas 9, Texas.

► **Navy Analyzes Avionics Spares**—Navy's Aviation Supply Office is conducting study of its avionics spare parts utilization to find ways of reducing stock on low turn over items.

► **Ramo-Wooldridge Expands**—Newly formed Pacific Semiconductors, Inc., wholly-owned subsidiary of Ramo Wooldridge Corp., will develop and manufacture semiconductors, including diodes and transistors. New company is headed by Dr. Harper Q. North, former director of Hughes Aircraft Co.'s semiconductor division. North says company should be in commercial production within a year. Parent company has started construction on a new 150,000-sq. ft. facility near the Los Angeles International Airport which eventually will house 1,000 office and lab personnel.

► **RTCA Fall Assembly**—A thorough analysis of the current status of the common system of air navigation and traffic control is slated for the second day of the Radio Technical Commission for Aeronautics' Fall Assembly, Sept. 30-Oct. 1, being held in Washington, D. C.

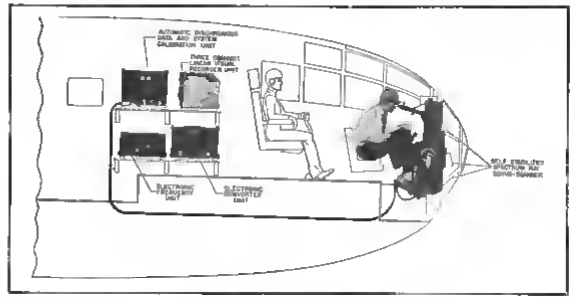
► **Airborne Track-While-Scan Radar**—Use of ground radar beacons, coded for automatic identification, should make it feasible to use simple track-while-scan techniques in airborne radar, permitting both ground surveillance and automatic navigation relative to ground beacons, Sperry Gyro's David Mannheimer told the recent Dayton avionics conference. He predicted that much of the future development of navigation radar would be centered around the use of beacons and track-while-scan techniques.

► **L-5 Shows Safe Auto-Approaches**—During recent certification tests on the Lear L-5 autopilot and approach coupler, installed on a Braniff Convair 340, the plane reportedly lost only negligible altitude during the CAA's three-axis hardover test designed to simulate autopilot malfunction during an automatic approach.

In the test, CAA check pilot causes autopilot suddenly to apply hardover signals to rudder, elevator, and ailerons during the approach, after which test pilot must take over and begin recovery. During L-5 test, the Convair Liner reportedly lost only 30 ft., altitude, including the normal 10 ft./sec. rate of descent.

► **Propagation Symposium**—National Bureau of Standards will hold a symposium on radio propagation, standards, and problems of the ionosphere, Sept. 8-11, at its new Boulder (Colorado) laboratories as part of the official dedication. Papers will include such subjects as ionospheric and tropospheric radio propagation, microwave techniques, radio spectrum utilization, atmospheric noise, and radio astronomy. Registration may be made by writing to T. N. Gautier at the NBS Boulder Labs.

► **Automatic Data Reduction**—An 88-channel telemetering and automatic data handling system, which processes, plots and prints telemetered data while flight tests are in process, is being installed by Douglas Aircraft's Santa Monica division.—PK



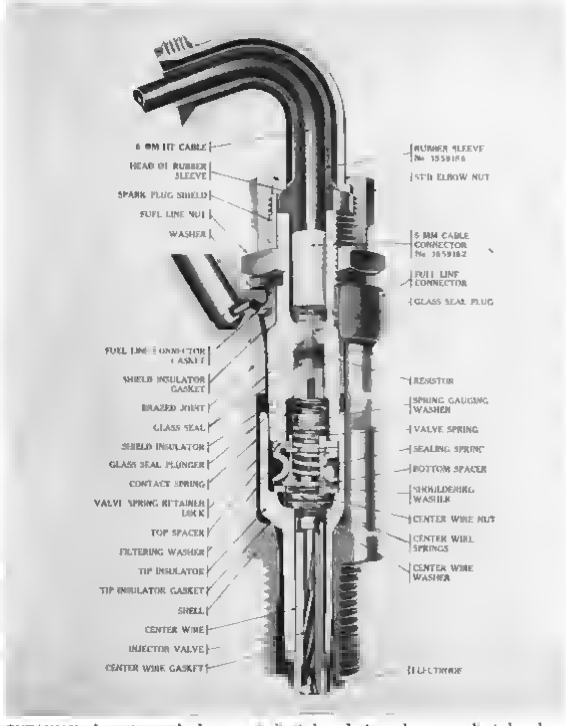
New Missile Sniffer

Flying B-29 infra-red lab will be used by USAF's radiation lab to investigate detecting missiles and aircraft by sensing their unseen infra-red radiation. Servo Corp. of America outfitted the B-29 with required instrumentation.

New Projects Occupy Spark Plug Firm



ASSEMBLY LINE at AC's Flint, Mich., plant produces aircraft spark plugs for USAF



CUTAWAY of injector spark plug, now in limited production, shows complicated package

• AC is developing ways to better construction and extend life, also is tailoring types to helicopter needs.

By George L. Christian

Flint, Mich.—The continuing battle to improve the construction of aircraft spark plugs and extend their operational life is being waged on many fronts here at AC Spark Plug.

Among the projects underway are:

- **An injector spark plug**
- **Helicopter plugs.**
- **Low voltage plugs**
- **A high-output plug**
- **Plug "petticoats."**
- **A new assembly method** of crimping the spark plug shell to the barrel.

AC lists among its previous accomplishments a monolithic insulator and a high-altitude plug.

▶ **New Assembly Method**—In the new production system, shortly to be incorporated in all AC aircraft spark plugs, the upper lip of the plug's shell is crimped over a shoulder machined in the lower portion of the barrel, forming a positive, mechanical lock between shell and barrel. As an added safety feature, the crimp alone can hold the plug together when excesive heat causes braze failure.

One advantage claimed for plugs assembled in this manner is ease of inspection, a quick glance enabling an inspector to determine if the braze has been completed. With a brazed joint only, it is difficult to determine if the braze has been done properly.

The feature was incorporated first in the AC 271 plug, a 3/20 high-altitude massive-electrode plug used on Pratt & Whitney Aircraft R2800 and Wright R3350 engines. The crimp now is being introduced on the AC-201 fine-wire, high-altitude plug.

▶ **Injector Spark Plug**—Limited production has begun again on this combination of fuel injector nozzle and spark plug used in piston engines. First produced during World War II for Wright Aeronautical, the IHA82 has been hampered by relatively complicated construction and high cost—10 times that of a conventional plug on a mass production basis.

Two big advantages are claimed for the injector plug:

- **Cylinder head design** is simplified for engine makers since the two functions

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RESEARCH

AERODYNAMICISTS
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The plug features extra heavy ground and center electrodes to stretch the unit's life to the maximum, thereby avoiding too frequent replacement of the relatively expensive plug.

At the end of World War II, when 1,000 IHA82s had been built, the program was suspended but now is being revived. Wright has indicated it will use the plug for general test and calibration work.

▶ **Helicopter Spark Plug**—An active program at the 2-million sq. ft. Dort Highway plant here is the development of spark plugs tailored specifically to the needs of helicopter engines in use by the anlines and U. S. Air Force. AC's aim is to manufacture a plug less susceptible to fouling, to increase its lifespan.

Spark plugs generally have a high mortality rate in helicopter operations. Average removal rate is 25 hr. of operation, as opposed to well over 100 hr. in reciprocating engines used on fixed wing aircraft. In an effort to reduce fouling many copter operators have resorted to using Shell Oil Co.'s fuel additive tricresyl phosphate (TCP).

▶ **Low-Voltage Plugs**—Samples of creepage-gap (surface discharge) plugs are being tested by AC engineers, who regard the experiment as "a project pregnant with possibilities." The plugs, intended for use in reciprocating engines, require only 500 v. for operation. Standard plugs require 13,000 to 15,000 v. to fire under takeoff power conditions.

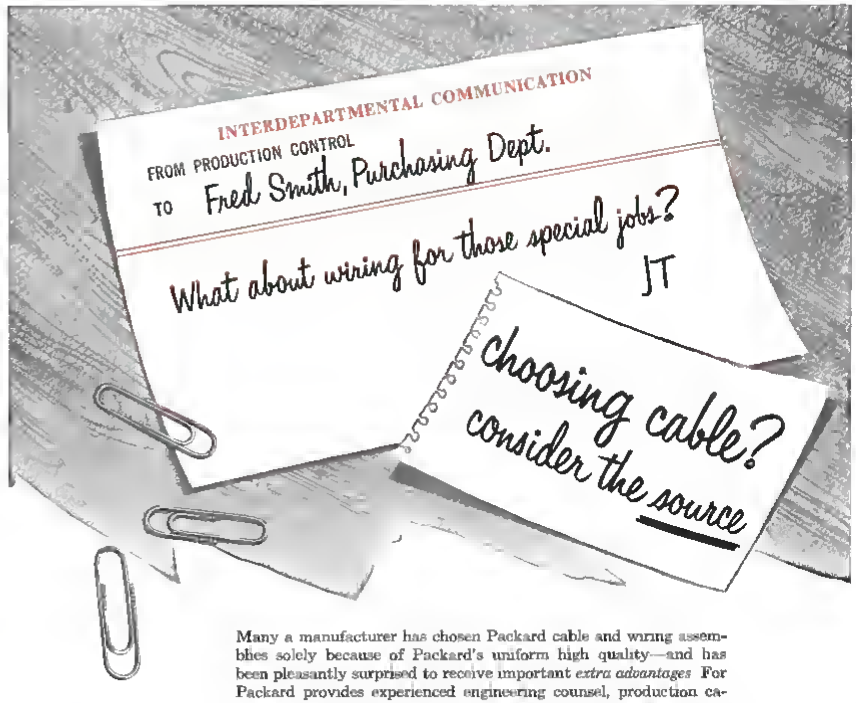
Two advantages are foreseen for the 500-v. system:

• **Generation,** distribution and insulation problems of an ignition system carrying such low voltage are simplified greatly, especially at high altitudes.

• **Plug fouling** would be minimized because of relative immunity of the standard electrode type plug.

▶ **High-Output Plug**—AC only recently has received approval for use of its high output plug developed for high output engines. Designed to withstand the high temperatures encountered in such engines, the plug is manufactured in two series: AG-285, a fine-wire, platinum-electrode plug, and the AG-275, equivalent to the 285 but of massive-electrode construction. AC reports both have attained the same status of acceptance.

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AVIATION, AUTOMOTIVE AND APPLIANCE WIRING



REPLACES BOATS—Newfoundland fishing areas are now patrolled by helicopter. The Fisheries Department of Canada operates this Sikorsky S-55, leased from Okanagan Helicopters, Limited. The versatile S-55 does more effective work than the several boats it replaces, and is available for official inspections and any emergency use.

AROUND THE WORLD WITH SIKORSKY HELICOPTERS



PIONEERING AIRLINE—Mohawk Airlines has added a Sikorsky S-55 to pioneer scheduled helicopter passenger service on part of its certificated routes. It is the second scheduled American passenger airline to use Sikorskys. Large, twin-engine helicopters eventually may be used by the airline to replace some of its fixed-wing equipment.



COPTERS ON THE MOVE—First helicopter of the Army's 328th Helicopter Transportation Company comes aboard a Navy Carrier bound for Germany. The Company is the first such Army helicopter unit sent to Europe. Equipped with 21 Sikorsky H-19s, its mission includes medical evacuation, air supply and cargo or troop movement.



WINGS OF MERCY—A Sikorsky helicopter, with rotors whirling, is shown in battle-torn Dien Bien Phu receiving French soldiers wounded in the heroic defense of the Indo-China stronghold. A stretcher bearer (right), rushes off for another casualty to be evacuated to a military hospital at Hanoi. The Sikorsky S-55 helicopter flew mercy missions in the thick of the Indo-China battle.

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high output plug are Wright's Turbo Compound R3350 (used in the Douglas DC-7 series and Lockheed Super Constellations). The 3350 also is used in such military planes as the Fairchild C-119, Martin P5M-2 Marlin and Lockheed P2V patrol bombers

► **Plug 'Petticoats'**—The AC engineers have designed an extension to the ceramic insulator to resist lead fouling. By forming it into a "petticoat," the thin ceramic tip surrounding the center electrode tends to follow the temperatures within the cylinder.

Result of this modification is that on compression and power strokes, these "petticoats" retain sufficient heat to prevent lead vapors coming from the tetraethyl content of the fuel to deposit on the nose of the ceramic. Plugs thus avoid the fouling caused by these lead deposits collecting on the nose ceramic and forming a shunt path to ground over the nose insulator surface.

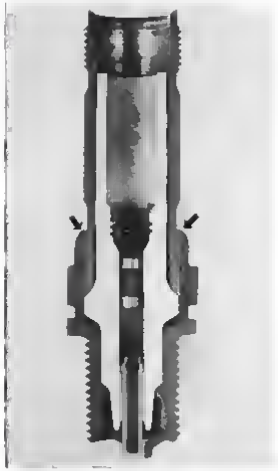
► **Construction Features**—Tame G. McDougal, AC's director of research and spark plug engineering, outlines these items as features of the company's various aircraft spark plugs:

• **No voids.** Centrifugal casting is used to eliminate any voids in the silver element of the center electrode in the AC-281 plug. This insures the best possible mechanical (and therefore thermal) contact between silver and ceramic insulator. To do this, a silver pellet is inserted into the nose of a ceramic insulator. With several attached to a centrifuge, it is whirled at high speeds in an oven hot enough to melt the silver. Ceramic, with silver centrifugally cast, is cooled and sent to later plug manufacturing operations.

• **No 'copper run-out'.** AC avoids copper runout of the center electrode of its massive-electrode plugs (such as the AC 271) by not exposing the copper to extreme heat sometimes experienced at those electrodes. To protect the copper, AC drills out almost the entire center of a bar of nickel, leaving only a small covering at the bottom. The internal copper core is pressed into the hole. Elimination of copper run-out solves such problems as extra-hot center electrode tips and avoids possible corrosion.

• **No gas leakage.** One of the center electrode elements (immediately above the silver element) is a gas tight glass seal which prevents any products of combustion in the cylinder from leaking into shell (upper portion) of the plug.

• **No arcing.** To prevent internal arcing which might occur if the steel core pin (above the seal) and the silver center came in direct contact with the graphite, powdered copper and graphite are interspersed in the seal. Copper also insures good contact with the steel and silver elements. The graphite acts as a 100,200-ohm resistance in the seal.



CRIMP locks 271 shell and barrel, while



BRAZE failure can separate this spark plug

► **Wide Usage**—AC spark plugs are approved for all larger radial, piston engines made by both Pratt & Whitney Aircraft and Wright Aeronautical. For P&WA, AC plugs have been approved for each engine from the R1830 through the R4360. For Wright, the same applies for each engine from the R1820 through the TC18DB1 Turbo Compound engine.

AC plugs are also approved for a long list of Aircooled Motors' powerplants.

In the jet engine field, AC igniter plugs are approved for installation in many models of Allison's turbojet engines, J33 and J35, and in the T56 turboprop. AC also has an igniter approved for several models of the General Electric J47 turbojet engine.

► **AC History**—AC Spark Plug Division which has grown in less than 50 years from a 15-employe organization to a firm that employs 16,000 persons, was founded by Albert Champion, who also was the guiding genius behind AC's competitor, Champion Spark Plug.

A Frenchman who came to this country in 1899, Champion had been at one time the bicycle racing titlist in Europe. He set himself up in a Boston garage in 1905 to handle the magneto and spark plug business and to supply spare parts for motorcycles.

In 1908 after losing minority control to his financial backers as a result of a controversy, Champion set up a shop in a small corner of the Buick plant in Flint. In October 1908, when he began again, AC had one product—spark plugs—and employed but 15 persons.

Today, AC Spark Plug—whose products range from model airplane plugs to fire control systems for the Skysweeper automatic anti-aircraft gun batteries—occupies over 3 million sq. ft. of floor space in three plants, two in Flint and one in Milwaukee.

OFF THE LINE

Superflexit, Ltd., of Slough, England, has been granted a license to manufacture and distribute Fluoroflex-T flexible aircraft hose and hose assemblies developed and made here by Resistoflex Corp., Belleville, N. J. (AVIATION WEEK Mar. 1, p. 48). Expected to start production in six months, the British firm will have exclusive distribution rights in the British Isles and all of the Dominions except Canada, with non-exclusive rights for Western Europe.

Lockheed and Boeing have taken opposite sides in methods of pressurizing their jet transport planes, industry observers report. Boeing is reported to think that pressurized air should be bled from the compressor section of the engine and piped to the cabin after passing through a suitable filter to remove oil or other contaminants. Lockheed's position is that compressed air cannot be filtered properly and it is contemplating installation of an independent cabin air compressor (which Boeing has decided would be too big and heavy).

Pacitron fuel gages will be installed on Capital Airlines' Viscounts, says Simmonds Aerocessories, Tarrytown, N. Y., maker of the gages. Viscounts to be delivered later this year to Trans-Canada Air Lines also will use Pacitron gages. Installation for both airlines will include a water methanol circuit in addition to the usual fuel gaging circuits. Also, there will be provisions for a load limit control.



Those long, pipeline attachments on this helicopter are "guns" in the war against the insect foe, spraying death for the moth with scientific precision

"Operation Squirt" at East Coast Aviation



CHECKING RADIO EQUIPMENT. Two Aero Tech students follow the school's guiding principle "Learn by doing," as they check radio equipment in nose of plane.



FUTURE PILOT. Aero Tech student smiles after successful "blind flight" in Link Trainer. Many graduates are now airline captains and maintenance supervisors.

If it involves an airplane, East Coast Aviation has probably done it. Located at Bedford (Boston) Airport in Massachusetts, this unusual firm services resident and transient aircraft, operates the famous East Coast Aero Tech training school for pilots and mechanics, and participates in missions ranging from pest control to air-sea rescue. No doubt about it—East Coast planes get a work out!

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FINANCIAL

Local Airlines Seen Here to Stay

Congress ignores ACC, favors permanent certificates for feeders; opposition grows to absorption by trunks.

Considerable opposition that has arisen to major recommendations of the Air Coordinating Committee's recently issued Civil Air Policy report dealing with the local service airlines makes it likely that these recommendations will be discarded.

One ACC proposal on the feeders concluded: "If a local airline does not make significant progress toward self sufficiency, within reasonable time and under normal economic conditions, its certificates should be terminated." The trunk airlines would absorb most of the feeders and their subsidy liabilities and meet their operational demands under the report's recommendation. But these proposals and the disposition of the problem were soon demonstrated to be unrealistic, both politically and economically.

▶**House for Feeders**—The alacrity and unanimity with which the House of Representatives passed a measure directing the CAB to grant permanent certificates to the feeders revealed the strong political support for this group of carriers in their present form. Similar support is indicated for this measure in the Senate.

House action points up the fact that it is Congress—and not an agency of the Executive Department—which in the final analysis will establish the course of national aviation policy. CAB is a creature of Congress and as such may be influenced much more from that direction. On this premise, the general platitudes and recommendations of the ACC's recent Civil Air Policy report are unlikely to have any lasting practical significance.

▶**Support, in Principle**—There can be no doubt that the House resolution for permanent certification of the local service airlines reflects grass roots political pressures. By this action, members of the House appear to satisfy the demands of their constituencies in preserving the independence of the local service airlines.

But this same enthusiasm on the part of Congress is not always present when it comes time to vote the necessary subsidy appropriations to assure the continued operation of the feeders. Recognition by Congress that such subsidy appropriation is a necessary concomitant of route authorizations would go a long way in preserving the local service airlines in their present form.

Mail pay support received by the feeders is essentially a subsidy to the communities served and not to the carriers themselves. This was firmly established by the extensive inquiry of the airline industry conducted by the Senate Committee on Interstate and Foreign Commerce during 1949 and 1950. Certainly, the financial results of the feeders reveals that they have not benefited appreciably by the subsidy support received.

Much can be said for or against the desirability of assuring the 437 points now in the feeder network, particularly the 258 exclusive local service stations, the advantages and trade benefits of direct air service. But once Congress declares the national policy to provide such service, it ought to be prepared to implement such directive with the necessary appropriations.

To do otherwise places the CAB in the ironic predicament (as it has in the past) of authorizing feeder operations under the pressures of Congress and ultimately encountering resistance from that same source for the essential financial support.

▶**Damage to Initiative**—By the same token, once the national policy, as decreed by Congress, is to support the local service airlines, the industry has a right to expect proper encouragement from the CAB.

For example, as pointed out by the recent House report endorsing permanent certification for the feeders, failure of the Board to support Pioneer's transition to 2-0-2s resulted in damaging future initiative to an extent exceeding immediate monetary savings to the government. Pioneer probably ultimately could have achieved a fuller potential meeting the needs of its area at less mail pay with the larger aircraft.

Certainly, Southwest has demonstrated a decreasing need of mail pay support operating a mixed fleet of 2-0-2s and DC-3s.

▶**Certification Problems**—Permanent certification of the feeders unquestionably carries with it many benefits. Long term planning and financing would be facilitated by such permanent authorizations. But this is only one side of the coin.

To freeze the feeder airlines at this time in their present form would destroy much of the flexibility available to the Board in strengthening the local service network, and may create more new problems than those solved.

For example, particularly troublesome and requiring considerable and increasing subsidy support is Braniff's South American route. At a time when carriers serving relatively heavier traffic-density areas (such as the trans Atlantic and trans-Pacific markets) received temporary route authorizations, Braniff obtained a permanent certificate for its international operation. The Board is now confronted with a rigid set of circumstances in attempting to resolve Braniff's mail rate and route problems.

As to the feeders themselves, much more can be done to strengthen their separate route patterns. The Board has faced up to a number of possibilities and has indicated that it will examine results at each station served and will decide whether or not the public benefit is sufficient to warrant the support required. In addition, CAB's staff has completed a detailed analysis of "loss" stations, and the Board has requested the carriers to make immediate application for authority to suspend service at such loss stations and over loss segments. Further, there are other measures that can be implemented to improve the feeders' position.

▶**New Set of Problems**—It is no solution to propose that the trunks absorb most of the feeders and their attendant subsidy liabilities. All this would do is to endanger the economic self sufficiency of the trunks and most, if not all, small stations in the feeder network would probably be closed down. Intermediate local service stations would probably have to be content with minimum schedules.

Accordingly, the ACC proposal, if fulfilled, would create an entirely new set of problems in disrupting the economic and route patterns of the trunks. Moreover, it would deprive wide segments of the country of local carrier service and connections with the country's airline network. This is contrary to the expressed will of Congress. The local service airlines, therefore, are likely to survive, for the most part, in their present form.

--Selig Altschul

Martin Pays Bunker $100,000 Salary

George M. Bunker, president and board chairman of Glenn L. Martin Co., received an aggregate salary during 1953 of $100,000, the firm reports to Securities & Exchange Commission.

Other executive salaries reported: J. Bradford Wharton, Jr., vice president-finance, $57,500; and George T. Willey, vice president-manufacturing, $45,000. All officers received a combined total of $453,620.

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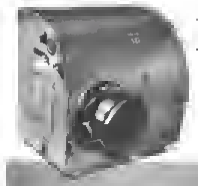
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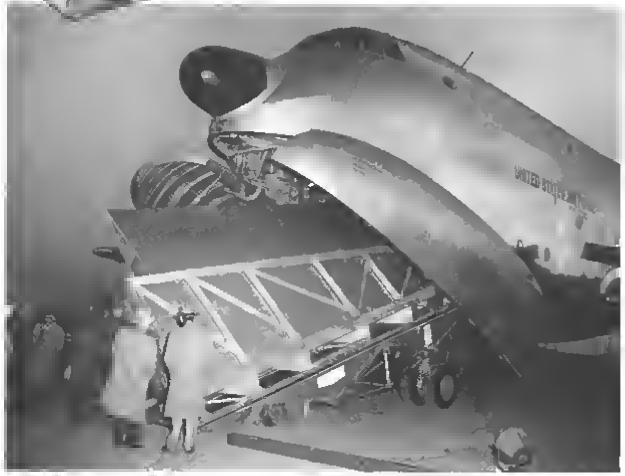
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The outstanding advantages of the Solar Generator Set accrue from its engine, the "Mars." Gas Turbine. The "Mars" weighs less than 100 pounds, is smaller than a two-foot cube, and produces approximately 50 hp. It is ready for full load in 15 seconds.

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Viscount Clearing Final CAA Hurdles

- **ARB agrees to meet modification requirements.**
- **Capital plans turboprop inauguration next April.**

By Richard Balentine

Britain's Air Registration Board notified Civil Aeronautics Administration last week that it was prepared to meet CAA's final modification requirements on the Vickers-Armstrongs turboprop Viscount, thus virtually clearing the last obstacle to CAA certification.

Although neither the British nor CAA would divulge the nature of the final modification list, it was understood that this agreement on the Viscount means certification is not far off.

►**Prototype Delay**—J. H. Carmichael, president of Capital Airlines, which is buying 40 Viscounts and has an option for an additional 20 (AVIATION WEEK Aug. 16, p. 376), said certification was expected "in a few days."

W. H. Weeks, CAA Aircraft Engineering Division chief who heads the Viscount certification group, said last month that a decision would be made "within three weeks" (AVIATION WEEK July 5, p. 15).

In the engineering chief's absence last week, CAA said certification would not be decided until prototype Viscount containing all of Capital's and CAA's modification requirements was available. This could delay certification even further.

But with final approval reached between ARB and CAA on paper, observers saw little doubt that certification was assured.

►**Similar Models**—The first of Trans-Canada Air Lines' 15 Viscounts on order will be ready sometime in September. Vickers revealed. It seems likely that, should certification await a prototype, the CAA group could investigate TCA's first Viscount, since the Canadian model is substantially the same airplane Capital is buying—with minor exceptions.

By picking up its option on 37 Viscounts and taking another on 20, Capital revealed that it would become a one-transport airline at a cost of $67 million including spares. Carmichael said one Viscount cost Capital "slightly over $900,000, including spares."

►**Biggest Sale**—Vickers called the sale and option "the biggest single sale ever made of a British airliner. So far as can be ascertained, it is also by far the largest single commercial dollar export order placed with a British company in any industry since the end of the war for any commodity, plant or equipment manufactured and assembled in Britain."

Vickers claims to have dollar orders amounting to $56.5 million at present. Viscount orders now total 143, the British firm reveals, with options on an additional 24.

As for its potential market for the turboprop transport, Vickers estimates there are 3,000 airliners (2,250 twin-engine and 750 four-engine) flying over routes suitable for Viscount operation.

The British aircraft builder plans to produce 25 Viscounts before the end of this year, 55 next year, 90 in 1956 and, if orders warrant it, "over 100" in 1957.



CAPITAL'S VISCOUNT. One airline, one plane cuts maintenance and operating costs.



CAPITAL'S CARMICHAEL. Setting the stage for air transportation's greatest advances.

Who will be next to buy the transport is difficult to say, but it is known that Northwest Orient Airlines has talked to Vickers—and went away interested. KLM Royal Dutch Airlines has decided against replacing its Convair 340 fleet because of the expense. Scandinavian Airlines System still is debating the financial pros and cons of such a move.

►**April Service**—Capital plans to fly its first 48-passenger Viscount on a major route sometime in April.

Fares will "in all probability not be affected," Carmichael said. The airline will operate night coach flights in addition to first-class service with the British airliner, but no decision has been made about day coach, he added.

The spares depot and overhaul base for the Viscount will be located near Washington National Airport, a serv-

ice center already is being opened in Canada at Winnipeg

In London, Vickers' designer-director George Edwards said his company's plans for after-sales servicing in North America might 'embarrass U S aircraft manufacturers "

► **Future Growth**—Carmichael said Capital had decided on ordering more Viscounts than originally planned because of 'increasing public acceptability of this comfortable airliner" and the fact that by becoming a one-plane airline, maintenance and operating costs would be cheaper

CAP's present fleet consists of 58 aircraft Carmichael explained that the airline originally had planned on 40 Viscounts to replace the present fleet but later figured the 20 additional would be required to handle an anticipated increase in business brought on by the introduction of the Viscount to the U S

'Scheduled operation of the Viscount will set the stage for one of the greatest advances in air transportation history," Carmichael said "The propeller turbine will progress hand-in-hand with the turbojet in the future of aviation growth"

Capital points out that during the first year of Viscount operation by British European Airways, the airline doubled its share of passenger traffic on the majority of its competitive routes

Airwork Buys DC-6As Seeks Interim Planes

Airwork, Ltd, Britain's largest independent airline, has started building up equipment needed to operate a scheduled airfreight service to New York under a permit granted by Civil Aeronautics Board

These are the latest developments

- Airwork purchased two Douglas DC-6A Liftmaster freighters with approval of the British government, since they will be used to earn dollars on its new service scheduled to begin in February or March next year
- The airline also may rent or charter on a "bare boat" basis (minus crews) of several Douglas DC 4s or DC 6s or DC-6As as interim equipment until its own DC-6As are delivered by Douglas in January or February 1956
- It plans to establish a sales office in New York soon

Airwork has received Canadian permission for a Montreal terminus The carrier says it eventually will buy Bristol turboprop Britannias when they become available

Last year, the British airline's fleet flew some 4 5 million miles carrying 84,755 passengers It also operates an aircraft repair and overall setup

New Round Opens in Alaska Case

CAB counsel opposes examiner's recommendations, suggests cutting all but two airlines from service.

Civil Aeronautics Board bureau counsel Arnold D Berkeley last week opposed recommendations made by chief examiner Francis Brown in the States Alaska service case calling for three or four airlines and argued in favor of limiting operations to two carriers in order to permit savings in subsidy mail pay

Berkeley suggested that Pan American World Airways and Pacific Northern Airlines be retained in States-Alaska service This would omit both Northwest Orient Airlines, and Alaska Airlines, which the examiner had recommended for merger with Pacific Northern (Aviation Week Aug 9, p 48)

► **One-Line Service**—The examiner failed, Berkeley said, to find that the 'ability of Alaska, Pacific Northern and Pan American to offer one-carrier service between the States and a plurality of points within the territory served on their respective intra Alaska and States-Alaska routes makes their service more useful to the traveling public than those of Northwest, which serves only one point in Alaska (Anchorage)."

Brown found that requirements of the public convenience and necessity 'dictate" certification of two large airlines, "presumably possessing sufficient capacity to meet unanticipated peak season service requirements, to operate between the States and Alaska"

Berkeley argued that "in consideration of the absence in this record of a showing of special circumstances it appears that the certification of one such carrier should provide ample capacity There is no evidence of record to support the examiner's finding"

Berkeley said the examiner also failed to

- Make any findings concerning the relative indirect cost levels of the four presently certificated applicants
- Find that Northwest has not been able to achieve any cost savings by virtue of its simultaneous operation of an international and a States-Alaska route
- Find that the substantial reductions in unit and indirect cost levels, achieved by Alaska and Pacific Northern after their respective entries into States-Alaska service, were due solely to the amortization of the "fixed cost" element in indirect expenses

► **Effect Cited**—Brown found that the route pattern originally proposed by CAB's Bureau of Air Operations would, by routing two States Alaska airlines from Seattle to Fairbanks via Anchorage have a serious adverse effect on the intra-teratory operations of Alaska despite the bureau's proposed restrictions against the carriage of local traffic between Anchorage and Fairbanks

' It is submitted," said Berkeley, "that such a restriction would eliminate entirely any possible diversion of local traffic

' No record evidence was presented by Alaska, or any other party, to the effect that any appreciable share of its 12,000 annual local Anchorage-Fairbanks passengers are States-Alaska passengers stopping over at Anchorage before continuing a journey to Fairbanks on the local carrier

"Furthermore, even if such evidence had been presented, it is submitted that it is not in the public interest to deny such States Alaska passengers the benefits of improved service with pressurized equipment and the substantially lower States Alaska fares."

The States Alaska case involves

- **Alaska Airlines**, seeking renewal or issuance of a permanent certificate for its Portland-Seattle-Fairbanks route, designation of Seattle as Seattle/Tacoma, and addition of Skagway/Haines and Anchorage as intermediate points
- **Pacific Northern Airlines**, seeking a 10 year renewal or permanent certificate covering its Portland/Seattle to Juneau-Yakutat-Cordova-Anchorage route; addition of Fairbanks as a co-terminal, addition of Kodiak, Gustavus and Ketchikan as intermediate points and elimination of the restriction in its present certificate requiring that flights serving Seattle and Juneau originate or terminate in Anchorage
- **Pan American World Airways**, seeking designation of Anchorage as a co-terminal with Fairbanks on its route from Seattle via Ketchikan Juneau and Whitehorse and addition of Skagway/Haines/Gustavus as an intermediate point between Juneau and Whitehorse
- **Northwest Orient Airlines** seeking renewal of its States Alaska routes redesignation of Seattle as Seattle/Tacoma and dropping of Whitehorse

► **Exceptions**—Berkeley also opposed other recommendations by chief examiner Brown including

- Northwest's Seattle-Anchorage certificate should be renewed if renewal of its trans Pacific route is found warranted by the public convenience and necessity

The examiner erred in this regard because there is neither an operational nor a cost integration of this carrier's international and States Alaska services Berkeley said

- The capacity for local Seattle-Anchorage traffic, afforded by NWA's through flights, is a material factor in this case

The international flights as scheduled "fail to meet the needs of local passengers and there is adequate capacity to move all local traffic on the turnaround flights" he argued

- The estimated revenue of $560,459, which Northwest contends would be earned by carrying local passengers on through flights will support its trans-Pacific route Berkeley said the evidence does not support this estimate
- The Bureau of Air Operation's earlier comparison of Northwest's experienced Anchorage station costs, during 1953, with the station costs incurred by Pan American at Fairbanks, Ketchikan and Juneau, during the same period "is not a fair comparison."

"The record evidence does not support the examiner's contention that there is any material difference in the type of passenger and service facilities required in connection with the international and States-Alaska flights," said Berkeley

- If renewal of NWA's certificate is required, it should be extended for a term coextensive with that prescribed in any renewed trans-Pacific certificate

"Examiner erred in assuming that the international and States Alaska services are so completely integrated that they should, in effect be treated as a single route," the counsel argued

- Pan American's entry into Anchorage would subject both Alaska and Pacific Northern to substantial diversion of the local traffic presently carried over their respective Anchorage-Fairbanks and Juneau-Anchorage routes

The restricted authorizations proposed by bureau counsel "would adequately guard against such diversion Furthermore, the first prehearing conference report issued in this proceeding by assistant chief examiner (Thomas) Wrenn, ruled that any authorizations granted herein would not carry with them new authority to transport local traffic from one States-Alaska terminal or intermediate points to another."

- A restriction prohibiting PAA from serving Anchorage and Fairbanks on the same flight.

"Apparently the examiner believes such a prohibition to be necessary in order to protect the local traffic of Alaska," Berkeley said "It is submited, however, that a restriction against the carriage of local traffic between Anchorage and Fairbanks would accomplish that objective"

- The terms of the conditional authorization for Pan American, to serve Juneau on Seattle-Anchorage flights.

Such an authorization would permit PAA to engage in direct competition with Pacific Northern between Juneau and Anchorage, the counsel claimed

- Failure to find that the applications of Pan American and Pacific Northern for the co-terminaling of Anchorage and Fairbanks should be granted, subject to the restrictions recommended by bureau counsel Berkeley said the granting of those applications "would enable the government to save approximately $800,000 annually in subsidy mail pay"
- The bare finding that Pacific Northern's record has been disappointing from the standpoint of cost to the government

While the recent increase in this airline's subsidy requirements "may be disappointing, it nevertheless appears to have a better record than the other three carriers now operating in States-Alaska service," he said

Last week chief examiner Brown extended the period for filing briefs to Sept 17, with oral argument Sept 28

Canadian Cargo Line Bids for CPA Route

Edmonton—Cheaper airfreight rates offered by Associated Airways for a twice-weekly run in competition with Canadian Pacific Airlines will result in greater development of the mine-rich north, the cargo line contends in a bid under study here by the Air Transport Board CPA now has a monopoly on the area's freight shipments

Associated has asked to run a scheduled freight line to serve Ft McMurray, Yellowknife, Uranium City, Ft Smith, Ft Resolution and Hay River from Edmonton CPA has countered that Associated stands to operate at a loss under its proposed rates and, at the same time, reduce CPA's northern revenue 25%.





UAL X-Rays Planes

Portable X-ray unit with greater penetrating power than standard medical outfits is being used by United Air Lines to search interior sections and structural parts of its airliners at its San Francisco 'push button" manufacture base. Use of the unit makes it unnecessary to take off metal skin, permits inspection of inaccessible portions of the landing gear and check electric plugs that, if opened, would be damaged. Picture above shows wheeled units X-ray tube (right) is connected by cables to control box at left. Photo (left) shows the tube being hoisted to check DC-6 rudder trim tab mechanism. While the tube is in action, the area is roped off, posted with danger signs and marked with red lights to warn of radiation danger. Made by C H F. Muller Co, Hamburg, Germany, the device is marketed in U S by North American Philips Co, Inc., under name Norelco UAL's unit cost more than $7,000.



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Board Probes Delay Of FTL-Slick Merger

Failure of Flying Tiger Line and Slick Airways to complete the merger approved in January by Civil Aeronautics Board (AVIATION WEEK Jan 18, p 80) has caused CAB to send one of its attorneys, Albert H Ruppar, to Los Angeles to obtain information on the unresolved issues

In approving the merger, the Board stipulated that the seniority problem between the pilots of both cargo airlines must be resolved by the pilots themselves An Apr 15 agreement deadline was set by the pilots and then postponed to May 1 (AVIATION WEEK May 17 p 20)

The problem still has not been solved

Involved are the Air Line Pilots Assn , representing Tiger pilots, and the Slick Independent Airways Pilots Assn

▶**New Decision?**—Ruppar has been assigned as bureau counsel in the case by Joseph H Fitzgerald, director of the CAB's Bureau of Air Operations He is to "assure that a proper record is developed which will serve as a basis for decision by the Board," should the airline request new CAB action, Fitzgerald said

The Slick pilots union wanted the Board to undertake integration of seniority lists but this was denied by CAB Jan 21

The Board held "While it is true that our decision does not specify the procedure to be followed if the parties cannot agree upon an arbitrator or the method of procedure for the arbitration, we do not consider this to be any defect in the conditions we have adopted"

▶**No Objection**—But since the problem of labor protective conditions has not been successfully solved, FTL has asked the Board to send a representative to Los Angeles to get the facts of the situation

Both unions involved say they have no objection to participation of a CAB representative, provided it is clearly understood that such labor groups are not committed in advance to any modification of the labor protective conditions."

With the Board's approval of the merger in January CAB's action is completed in the case until one of the parties petitions for reopening and reconsideration or modification of the provisions of the order

Fitzgerald pointed out to Ruppar that "it should be distinctly understood that you do not have authority to serve as referee, arbitrator or mediator as between the parties to the proceeding and that you have no authority to impose or even propose any agreement or solution to the parties to the proceeding '

▶**Merged Operation**—Once the labor issue is resolved, the merged airfreight line will be known as Flying Tiger-Slick Airline Robert W Prescott, Tiger president, will be chief executive of the new company

Pending the official merger, cargo loading and maintenance will remain separate. Flying Tiger's main offices in Burbank, Calif , will house executive and accounting offices

CAA Tests Traffic Control by Pilots

Pilots may be able in the future to establish their own methods of traffic separation at airports with no control towers Civil Aeronautics Administration has developed and successfully tested a method that uses the interconnection of a number of radio receivers with the terminal very high frequency omnidirectional range (TVOR)

Under this system, pilots broadcast an abbreviated flight plan by radio The plan is rebroadcast automatically by the TVOR ground station so that it can be picked up by any other aircraft operating within the area

Pilots of all aircraft concerned then can exchange pertinent information and work out their own landing sequence or other traffic separation problems

The system has been tested at CAA's Technical Development and Evaluation Center at Indianapolis, Ind The automatic rebroadcast system was developed and tested by CAA as an adjunct to TVOR, a navigational facility that makes possible approaches during instrument weather to airports with low traffic density

The equipment provides an automatic acknowledgment signal of three seconds duration at the conclusion of each pilot transmission This assures the pilot that his transmitter has been working properly and his message has been received

The technique developed CAA says, would be equally applicable in conjunction with a control tower or a very high frequency omnidirectional range, of which CAA has 376 in the U S

Transport Chief

Senate confirmation of E George Siedle as Assistant Postmaster General—Bureau of Transportation by the Senate was virtually assured last week He will succeed John C Allen, who resigned effective Sept 1

Siedle was formerly general traffic manager of Armstrong Cork Co , Lancaster, Pa He was influential in establishing the Lancaster Municipal Airport and is president of the Associated Traffic Clubs of America

NARCO DME HAILED BY PILOTS

Distance Measuring Equipment Adds New Safety, Efficiency and Flight Ease for VFR and IFR.

Positive, continuous indication of exact position is now an everyday reality for scores of aircraft equipped with the new Narco DME This Distance Measuring Equipment tells the pilot his exact distance from any VOR/DME or ILS/DME station.

Since the Narco DME was introduced, executive aircraft in all parts of the country have been equipped with this new electronic navigation aid and many more installations are being completed each week Built to full airline standards, the Narco DME is also undergoing exhaustive airline evaluation with excellent results reported to date for safer and more efficient scheduled operations

Those who are now using DME report greatly simplified VFR and IFR operations—no more cockpit calculating to estimate position, ground speed or winds aloft easily checked; ETA's on the money, holding patterns 'duck-soup', and ILS approaches far simpler.



Two-Scale Reading

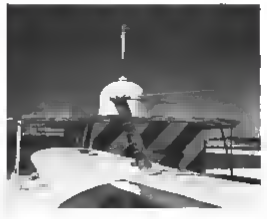
The Narco DME was developed under CAA/ANDB sponsorship and is the first of Narco's Sapphire line of equipment designed to the very highest electronic standards possible It meets full CAA Type Certificate requirements for airline use and has exclusive crystal-tuning feature for positive 'locked-on" tuning with no chance of off-frequency transmission or reception.

Mileage is given on the standard size, panel mounted indicator shown above. By flipping a switch the pilot can select either the 0-200 mile scale or the 0-20 mile scale for precise close-in approach or ground speed check.

The main interrogating unit is remotely installed on a standard ½ ATR rack. Total equipment weighs only 32 pounds.

DME System Nears Completion

DME is the next link in the common-system of navigation agreed upon by the military and civil air space users and now being implemented by CAA.



The vertical pole above the dome-shaped VOR station is the DME antenna, now being installed at all VOR stations throughout the country and at many ILS sites to give the pilot precise information on distance to touchdown 246 DME stations are already in operation with the entire system to be completed in less than a year, according to CAA

Nation-wide Narco DME Service

To assure users of perfect operation of their Narco DME, Narco established a complete nation-wide service network and conducted an extensive service school even before the first DME was delivered.

Service centers with complete test equipment are now in operation at conveniently located spots. Thanks to this and the unitized construction which permits quick and simple interchange of basic elements, Narco DME users can be sure of continued, reliable use of their equipment.

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Enthusiastic DME Users Report



THE CRANE COMPANY of Chicago installed Narco DME in their DC 3 after careful evaluation by their Chief Pilot Randy Mulhern (left) well-known executive pilot and former head of CAA's Airways Flight Inspection. At right is Frank Bohling, Bohling Aircraft Co., Chicago installation and service center for Narco DME



MICHIGAN TOOL COMPANY's Lodestar has flown 75 hours now with Narco DME. Chief Pilot Paul Holst reports "It certainly is nice to be able to give a quick, accurate answer to the old question 'What is your present position?' Checking ground speed quickly is also a big help We are most enthusiastic about our Narco DME."



MARION ELECTRICAL INSTRUMENT CO. Manchester, N H have Narco DME in their Aero Commander "In particular we consider it a primary navigational aid on approaches to fields that are off airways or not equipped with landing systems," reports H A Donahue (left) Sales Manager, Aviation Division, shown with R.A. Ammon, President

CAB ORDERS

(July 28-Aug 4)

GRANTED

American Airlines authority to suspend service temporarily between El Paso, Tex., and Monterey, Mex., and El Paso and Mexico City, pending disposition of its related request to abandon service over the two routes

Continental Air Lines temporary exemption to serve Houston and San Antonio Tex., up to a maximum of three roundtrips per day provided such flights originate or terminate at El Paso or beyond and are operated nonstop between El Paso and San Antonio. The exemption will be effective only if the interchange schedules of American, pursuant to the Continental-AA interchange agreement, are suspended by reason of the American pilot's strike

City and chamber of commerce of Columbus, Ga., city and chamber of commerce of Hot Springs National Park, Ark. and Knoxville Tenn., chamber of commerce leave to intervene in the additional Southwest Northeast service case

APPROVED

Interlocking relationship created as a result of Robert Lehman serving as director of United Fruit Co. while a director of Pan American World Airways

New York Airways' application to fly from Trenton, N. J., to New York's La Guardia Airport via Princeton, N. J., New Brunswick, N. J., and New York International Airport and on two flights from La Guardia to Trenton via New York International, Newark Airport, New Brunswick, and Princeton

ORDERED

Suspension period of fares ordered for Northwest Orient Airlines, United Air Lines and Western Air Lines extended from Aug. 10 to and including Nov. 8

New York Airways to show cause why the Board should not fix its mail rates

Piedmont Aviation to show cause why CAB should not fix its mail rates

(Aug. 4-10)

ORDERED

Resort Airlines be allowed to make stopovers in Miami, Fla., on all its all-expense tours

Amendment to Central Airlines certificate to include Joplin, Mo., and Muskogee, Okla.

APPROVED

Intercompany arrangements between Northwest Orient Airlines and North Central Airlines and various other air carriers

Agreements between Pan American World Airways and various other air lines relating to conditions applicable to mixed class aircraft as adopted by International Air Transport Assn.

GRANTED

Midet Aviation Corp. permission to use Miami Municipal Airport beginning Aug. 6

United Air Lines temporary suspension of service at Bradford, Pa.

EXEMPTED

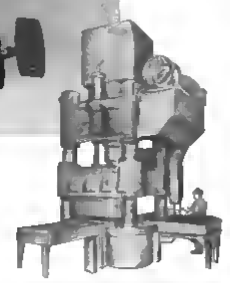
Allegheny Airlines temporarily to enable the feeder line to operate more frequent service into Bradford, Pa.

Seaboard & Western Airlines to operate one passenger flight from Amsterdam, Holland, to Newport News, Va., on or about Aug. 13

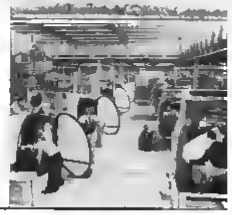
SEVERED

Eastern Air Lines' application from the additional Southwest-Northeast service case.









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TWA Wants to Close Gap in Europe Routes

Trans World Airlines is trying to get a new route that would close the 178-mile gap between Frankfurt, Germany, and Zurich, Switzerland, and link TWA's services in Europe.

In a brief filed with Civil Aeronautics Board last week, the airline claims the new route would:

- Provide a substantial amount of new service by an American-flag carrier, both stopover service for United States travelers and local service between London and Frankfurt and other points on TWA's route. This service now is available only on foreign airlines.
- Increase TWA revenues and reduce subsidy requirements.
- Remove certain competitive disadvantages under which TWA now operates.

Syria Buys U.K. VHF

(McGraw-Hill World News)

Damascus, Syria—Two British firms have secured a substantial contract for radio communication and direction finding equipment from the Syrian Ministry of Defense in the face of fierce competition.

Winners of the contract are Marconi's Wireless Telegraph Co., Ltd., and International Aeradio, Ltd. Work entails planning and engineering a complete radio communications network, including automatic and manual VHF mobile and fixed direction-finding stations with associated ground and air communications.

Also involved is setting up a training school for Syrian Air Force personnel, including planning of buildings and textbooks.

SAS Skips Cyprus

(McGraw-Hill World News)

Nicosia, Cyprus—Scandinavian Airlines System planes will omit their refueling stop at Cyprus en route from Stockholm to the Far East. In the future, flights will go from Rome directly to Abadan.

Observers say SAS is taking this action because it has been unable to receive traffic rights for Cyprus.

The airline began using Cyprus as a refueling stop three months ago following a Saudi Arabian threat to shoot down any planes flying over the country after landing in Israel. Its planes previously had made landings at Lydda Airport, Israel.

CAL-Eastern Signs Up Jap Nonsked

California Eastern Airways has signed an operations contract with Japan Pacific Airlines, a new company seeking permission from its government to fly a low-cost nonsked service from Tokyo to Sao Paulo, Brazil, by way of San Francisco.

CEA's contract provides for the airline to supply equipment, probably two DC-4s, personnel, maintenance and ground services and training at cost plus 10%.

Length of the contract is said to be for one year with a provision for renewal.

President of Japan Pacific Airlines is Susumu Saito, prewar director of Osaka-Shosen-Kaisha. OSK interests are said to be sponsoring the new airline. Saito also was one of the backers of Japan International World Airways, which lost out to Japan Air Lines for a trans-Pacific service.

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SHORTLINES

▶ **Allegheny Airlines** flew 4,580,000 passenger-miles in July, a 28% increase over July 1953 and the highest in the company's five year history.

▶ **Avianca** and Lockheed Aircraft Service-International have entered into an extended, integrated maintenance and overhaul program on a fixed-price-per-flight-hour basis, covering three Lockheed Super Constellations slated for delivery this month and one Connie presently in operation on overseas routes.

▶ **British European Airways** and KLM Royal Dutch Airlines have signed an agreement to begin operating one-plane service Oct. 3 on flights between London and Amsterdam. BEA reports 485,000 passengers were flown a combined total of 6,146,000 mi. during April, May and June, a 12% increase over the same period last year.

▶ **Capital Airlines** has signed an agreement with Air Express International Corp. providing for through movement of airfreight shipments from CAP to connecting overseas carriers.

▶ **Railway Express Agency** and 30 domestic scheduled airlines have signed a new five year agreement providing for Air Express service.

▶ **Riddle Airlines** carried a record 3,652,758 lb. of airfreight during July, compared with 1,408,239 for the same month last year.

▶ **Lake Central Airlines** reports operating costs averaged $1.22 per mile during the 12 month period ended June 30, compared with $1.36 for the previous fiscal year. Load factor for June increased 30.6% above June 1953.

▶ **Mohawk Airlines** flew 3,786,825 passenger-miles in July, a gain of 53.5% over the same month last year. Load factor was 50%, compared with 44.15% for July 1953.

▶ **Northwest Orient Airlines** has inaugurated daily overnight sleeper service on Boeing Stratocruiser flights from New York to Spokane/Seattle.

▶ **Panagra** has won the Inter-American Safety Council's Aviation Award and the National Safety Council's Aviation Safety Award for 1953.

▶ **Pioneer Air Lines** has carried its millionth passenger, a mark chalked up during PAL's celebration this month of the start of its 10th year of operation. . . The airline has flown over 280 million passenger miles in scheduled operation without injury to passengers or crew members.

▶ **Japan Air Lines** will increase its Tokyo-San Francisco DC-6B service from one to three flights weekly in September, plans to inaugurate monthly Tokyo Sao Paulo, Brazil flights via San Francisco, New Orleans and Caracas in October and has scheduled expansion of Far East service to Hong Kong for November.

▶ **KLM Royal Dutch Airlines** will operate flights to and from Leipzig, Germany, via Bremen and Hannover Sept. 5-15 in connection with the annual Leipzig Trade Fair.

▶ **North Central Airlines** has added a third daily roundtrip to Hibbing and International Falls, Minn., an extension of its service between Minneapolis-St. Paul and Duluth-Superior. NCA also has started operating a seventh flight on its Madison-Chicago route. . . . The airline flew 28,845 revenue passengers in June, setting a new company record.

▶ **Southern Airways** flew an all-time company high of 12,250 passengers approximately 2,050,000 passenger miles in July, exceeding the previous record set October 1952 by 3%.

▶ **United Air Lines** flew 1,430,866,000 revenue passenger-miles in the first six months of 1954, 14% above the same period last year. Freight shipments in the period just ended came to 15,177,000 ton-miles, and annual totaled 10,612,000 ton-miles, increases of 9% and 3% respectively. Revenue passenger-miles in June totaled 324,930,000, up 21% over June 1953 and exceeding the company's entire year of 1942 by 17%. . . . Shippers now can make advanced reservations for airfreight space aboard UAL's planes on either a specific flight or delivery time basis.

▶ **Western Air Lines** has taken delivery on four additional Douglas DC-6Bs. Price tag: $1.3 million each.

Modified DC-6Bs

Pan American World Airways is modifying the forward compartment of its DC-6Bs to a quickly convertible cargo area that increases the usable airfreight space on its 17 DC-6Bs by 1,800 lb. each. PAA also has put the DC-6A into daily service between New York and San Juan, P. R. Each can carry as much as 26,000 lb. cargo.

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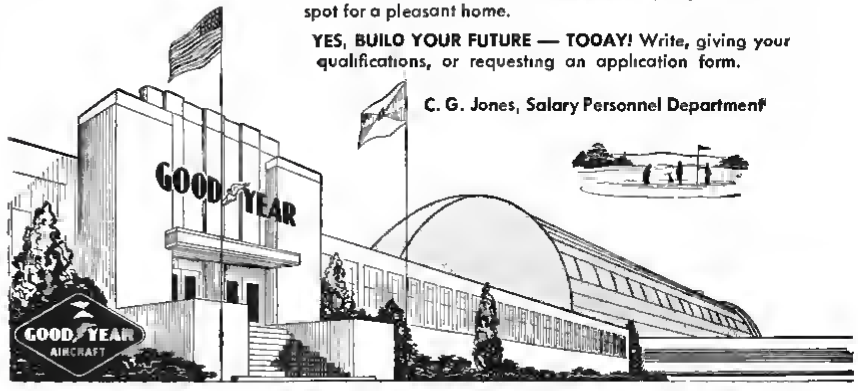
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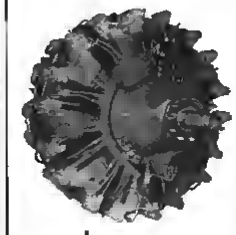
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Immunity for Pilots

A recent move by the Civil Aeronautics Board may very well be one of the most important steps taken toward safety in many years By majority decision, the Board has decided that under certain conditions pilots testifying at an accident investigation should be granted immunity from subsequent disciplinary action

Offhand this may seem trivial, but actually it is of tremendous importance Until now, hearings have resulted in a rather nasty situation in apparent disregard of the privileges of the Fifth Amendment That is, a pilot would be compelled by subpoena to appear and testify at a hearing Later his own words would form the basis of a CAA violation against him This obviously was no enticement for a witness to bare his soul to the minutest detail during an air accident investigation.

►**Pilot Dilemma**—Accident hearings never have been conducted in strict accordance with legal methods as used in courts of law The pilot was never quite sure whether the end product was supposed to be an objective analysis leading to safety measures or a trial aimed at "getting somebody"

Since it is impossible for a pilot to foresee the effect his words may have on other ears—especially unaeronautical ears—he naturally is hesitant to say too much lest it be the wrong thing and he gets clobbered. Truly objective hearings are hard to come by under such circumstances

►**CAB Decision**—The incident that brought the matter to a head was the American United in flight collision over Michigan City, Ind , a year ago this August After hearing the evidence, obtained by subpoena, the Civil Aeronautics Administrator filed a complaint against two of the pilots for carelessness, etc , in violation of CAR

The Board in dismissing the complaint said "It does not appear that more than a disciplinary suspension is sought" But CAB made it clear that if a case existed relative to lack of qualifications on the part of the pilots, the door was open for filing of a new complaint.

►**Limitation**—That, then, is the dividing line of the decision Violations filed for purely punitive or disciplinary reasons are ruled out in those cases where qualification of the pilot is not an issue The Board makes it clear that it is not "trading immunity from suspension or revocation for information."

Also, this immunity in no way extends to cases where lack of qualification, deficiency of technical ability, unfamiliarity with regulations or physical disability exist

In other words, if it is discovered under forced testimony or otherwise that the pilot is in some way lacking in competency, he is not immune to anything—except perhaps ever flying again This, of course, is as it should be No one wants incompetents in the air.

►**'Makes Good Sense'**—Occasionally, as in this AA-UAL collision, pilot qualification is in no way under fire At these times the new ruling will aid in getting all the facts

An indication that the Board does have a heart after all is shown in this statement: "Rather than putting the respondents (that is the pilots) to the burden and expense of defending in proceedings" where not "more than a disciplinary suspension is sought," the complaint would be dismissed

Although this state of affairs has been a long time coming, the Board's decision is fair play and makes good sense. Pilots will appreciate it and safety will benefit

AVIATION CALENDAR

Sept. 4-6—1954 National Aircraft Show, James M Cox Municipal Airport, Dayton

Sept. 7-12—Society of British Aircraft Constructors 1954 Flying Display Farnborough, England

Sept. 8-11—Symposium on propagation, standards and problems of the ionosphere, sponsored by National Bureau of Standards, Central Radio Propagation Laboratory, Boulder, Colo

Sept 13-17—International Air Transport Assn , 10th annual general meeting, Hotel de la Rochefoucauld, Paris

Sept. 13-19—Civil Aeronautics Administration, first postgraduate course in civil aviation medicine, Ohio State University, Columbus

Sept 13-24—Instrument Society of America, first International Instrument Congress and Exposition and third annual Analytical Instrument Clinic, Philadelphia

Sept 19-21—International Northwest Aviation Council, 16th annual convention, Hotel Vancouver, Vancoover, B C

Sept. 21-23—Society for Experimental Stress Analysis annual meeting and exhibition, Bellevue Stratford Hotel, Philadelphia

Sept 30-Oct 1—Radio Technical Commission for Aeronautics fall assembly, Washington, D C

Oct 1-2—Airmail Pioneers division reunion, Lexington Hotel, New York

Oct. 4-6—Tenth annual National Electronics Conference Hotel Sherman, Chicago

Oct. 5-7—Champion Spark Plug Co , 10th annual Aircraft Spark Plug and Ignition Conference, Secor Hotel, Toledo, Ohio

Oct 5-9—Society of Automotive Engineers, National Aeronautic Meeting Aircraft Production Forum and Aircraft Engineering Display, Hotel Statler, Los Angeles

Oct 11-12—Aircraft Industries Assn., symposium on titanium standard parts, Cleveland

Oct 14-15—Tenth annual National Conference on Industrial Hydraulics, sponsored by Illinois Institute of Technology, Sheraton Hotel, Chicago

Oct. 17-22—International Union of Aviation Insurers, annual general meeting New York

Oct. 18-22—National Safety Council, Aeronautical Section, Conrad Hilton Hotel, Chicago

Oct. 23—Airmail Pioneers division reunion, VFW Club Elmhurst Ill

Nov. 8-9—National Aviation Trades Assn , annual convention and meeting Biltmore Terrace Hotel, Miami Beach, Fla.

Nov 8-10—Air Industries & Transport Assn of Canada, annual meeting Chateau Frontenac, Quebec City.

Nov 9-12—Air Line Pilots Assn , convention, Sheraton Hotel, Chicago

Nov. 11-12—Airmail Pioneers, division reunion, Hollywood Roosevelt Hotel, Los Angeles

Nov. 15-17—Aviation Distributors and Manufacturers Assn 12th annual meeting, Mayflower Hotel, Washington, D C

May 4-6—1955 International Aviation Trade Show, 69th Regiment Armory, New York

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LETTERS

Opinion Unnecessary!

It is presumed that being an editor requires one to express opinions on all subjects

There was no necessity for your remarks on our current dispute with American Airlines in the editorial section of the Aug 9 issue of AVIATION WEEK. We find that very few people in the aviation industry are familiar with or comprehend the workings of the Railway Labor Act. For that matter, very few people know that it exists, although it is at least the second most important statute affecting the aviation industry. We would like to suggest that aviation writers spend some time with the National Mediation Board or the labor relations people of air carriers or representing organizations in order that they may acquire at least some knowledge of this aspect of the aviation business.

You seem to attempt to place the responsibility on the Air Line Pilots Association for the American Airlines strike. As far as we know, you have never conducted any investigation of the circumstances leading to it nor have you ever talked with the writer, any of our staff or American Airlines' pilot representatives concerning it. You would probably be interested to know, for example, that this dispute started in September of 1953 and that ALPA had exerted every possible peaceful effort available under either the Civil Aeronautics Act or the Railway Labor Act in an effort to find an answer to this problem.

You state: "There must have been ways to protect ALPA, as well as American Airlines." We agree and we have tried to explore all of them. Unfortunately, we had absolutely no cooperation and American Airlines unilaterally and arbitrarily persisted in change a historic working rule without conferences or recourse to any of the procedures of the Railway Labor Act. For that matter, they completely refused to even process the problem under the Railway Labor Act. The only legal and available process to the pilots under the circumstances was that selected.

The facts in this dispute are no farther away than your telephone. You are welcome to our offices. We don't like strikes any better than you do but let's place the responsibility where it belongs by determining the facts before we pass judgments. American Airlines could have averted the strike by merely arranging for crew changes on three flights while the problem was being processed under the procedures of the Railway Labor Act. It could be terminated today within a few minutes on the same basis.

If you are interested in the facts, we are available.

CLARENCE N. SAYEN, President
Air Line Pilots Assn
55th St. & Cicero Ave.
Chicago 38, Ill.

(Our friend is certainly entitled to his opinions which we are glad to print. The letter, however, appears to be based on the questionable premise that we wrote the editorial without knowing "the facts." The deteriorating relations of ALPA and AA have been widely discussed in all airline circles for months. And if ALPA does not have responsibility for calling this strike, then who did call it? As constructive criticism, we hope ALPA after the strike is over will study seriously the increasingly important subject of public relations, which it has virtually ignored.—R. H. W.)

Opinion Expected

May I express to you my gratitude for the editorial appearing in the AVIATION WEEK, on August 9, entitled *ALPA's Mistake*.

I am grateful, among other reasons, for this basic reason:

When there is a controversy involving the public interest each of the parties will endeavor, of course, to "put his best foot forward", and thereby to influence people toward his point of view.

The average reader does not always have the ability to separate the wheat from the chaff. The reader expects you, drawing upon your broader experience and sources of information to form a conclusion and to express your opinion. That is an especially worthy area of public service and one necessary to maintain if the public is to be informed.

I hope, of course, that you will believe that the merit of this controversy lies principally with our airline. But that is for you to decide.

C. R. SMITH, President
American Airlines
100 Park Ave.
New York 17, N. Y.

'Honest Effort'

I read your editorial today regarding the American strike. I wish to take exception to your position and point out certain facts.

The fact that American was cited for violation after 6 months of operation of their non-stop on a phoney schedule, and after being cited rather than attempt to comply with the law, they applied for and received a waiver amending the regulations to suit their needs, is evidence that the Civil Aeronautics Board has failed in their obligation to the American public.

There is a great deal of talk today about the modern airplane being so easy to operate that a person could just sit in the cockpit for any number of hours and not feel anything but rested. Let us not forget that the modern airplane has become so complex that an emergency, particularly at the last critical moment of the trip, is an experience that will tax all the knowledge and background that today's airline pilot has at his command. The motto of the Airline Pilots Association is "Schedule with safety", and they mean just that. To extend the flight time limitations is to increase the hazard beyond justifiable limits.

You criticize the Air Line Pilots Association and say there must have been other alternatives. I don't believe there has, in the history of labor management relations, been a more sincere and honest effort made as ALPA made this time to resolve this problem short of a strike.

W. A. MURPHEY, Jr.
Member, board of directors
Air Line Pilots Association

'Best Statement Yet'

Your editorial, "ALPA's Mistake", is the best statement yet printed regarding the ALPA-AA dispute.

Almost without exception, the senior pilots who have the most long-haul nonstop experience are in favor of some adjustment of the 8 hour law.

We realize that the non-stops are here to stay. They benefit the industry and, in the long run, what benefits the industry benefits the pilots. Certainly this problem can be solved without the action that benefits no one—the strike.

LEO KAILOFF, ALPA 1670
2315 Easton Drive
Burlingame, Calif.

'Both Sides Wrong'

I enjoy reading AVIATION WEEK because it is well edited, and you are willing to express a conviction on controversial subjects, regardless of where the chips fall. Your two editorials in the Aug. 9 issue are examples.

I believe any strike is inexcusable until the same kind of efforts and compromise that eventually would settle it have been made. If a business is to be a good place to work for employees and management, and a good investment for its security holders, its customers must come first and it must be protected from any preventable strikes.

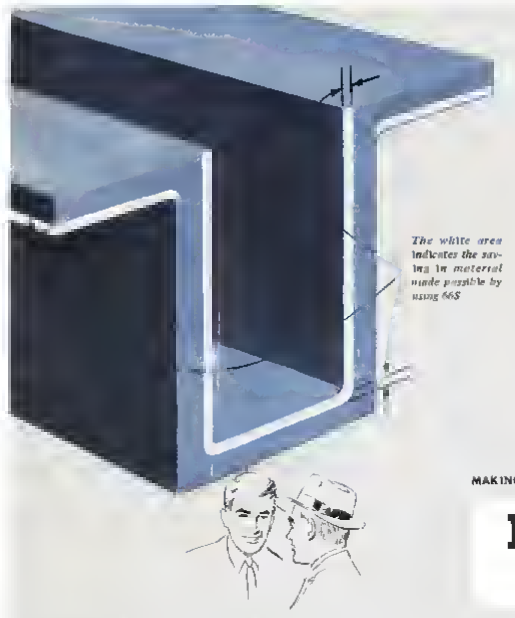
As an American Airlines stockholder, I think the actions of both the union and the management are inexcusable. The union is not on solid ground, and neither is American Airlines. American Airlines flaunted both its contract with the union and the CAB rule that was changed to legalize the company's position after it had been held in violation of the rule.

I think it was just as much a mistake for American Airlines to take an unyielding stand and force a showdown, as it was for the union to call the strike. The management should have protected the business and taken care of its customers by keeping the planes flying while it continued to work out the problem with the union, even if it became necessary to temporarily discontinue the non-stop east-west flights. Technological progress will solve the problem fairly soon. When the strike is finally settled, it will be the result of eventual compromise, as is invariably the case.

As an investment analyst and adviser and an investor in airline securities on occasion, I am concerned with two unfavorable conditions. One is the fact that the CAB decisions are frequently the result of political pressure; and the other is that there are too many "prima donnas" in high places in the air transport industry. It is not necessary to file a bill of particulars. Every one knows it is true of the other fellow. I wish there were teamwork on all company and industry problems.

JUSTIN T. BARBOUR
Barbour's Investment Service, Inc.
105 West Adams St.
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